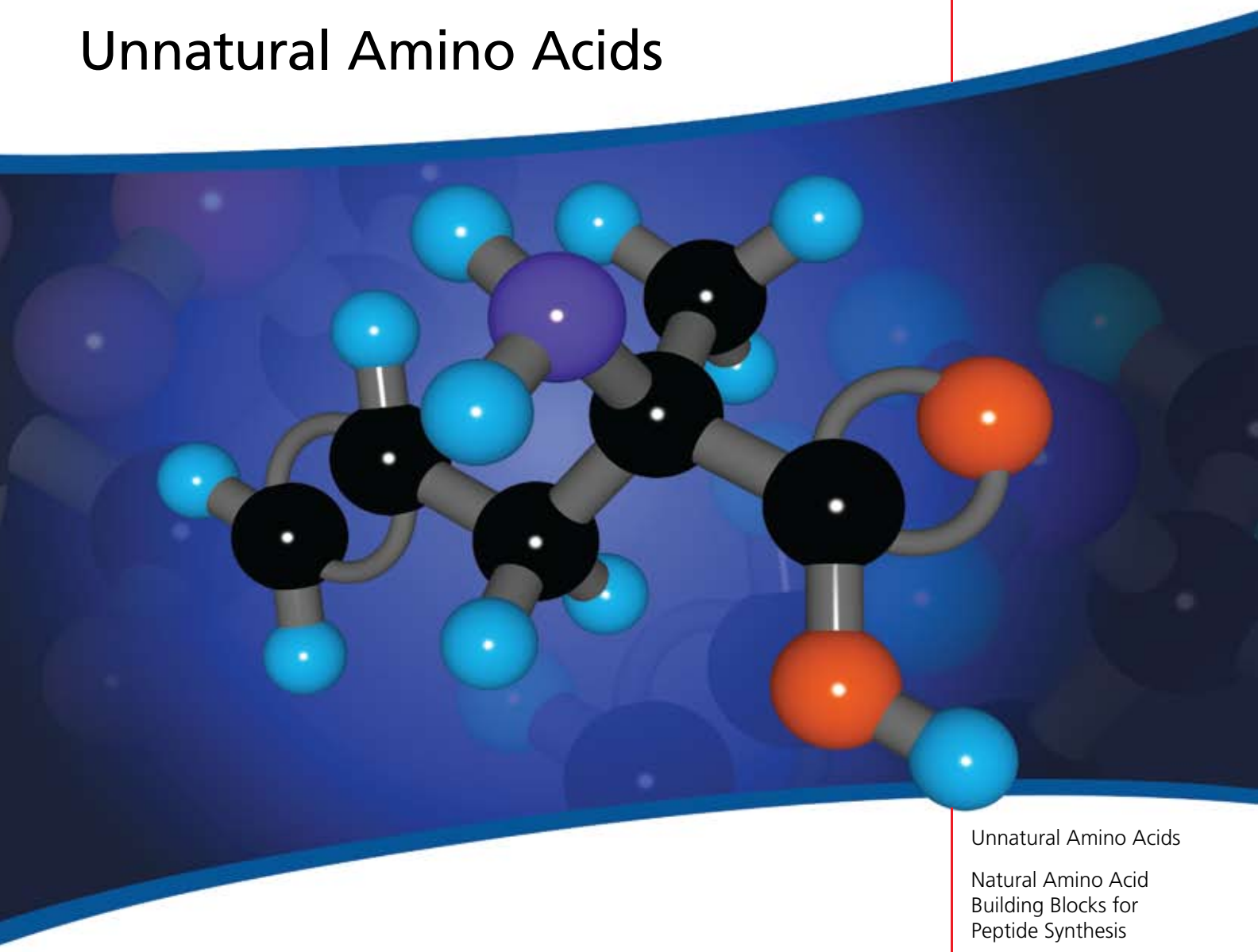
ChemFiles

Vol. 8, No. 7

ALDRICH Chemistry

Unnatural Amino Acids



(R)-Allylalanine: a versatile α,α-disubstituted amino acid for peptide synthesis.

Introduction

Natural as well as unnatural amino acids are utilized as chiral building blocks, conformational restraints, molecular scaffolds, and active pharmaceutical ingredients. They represent a nearly infinite array of diverse structural elements for the development of new therapeutic drugs or functional materials. With an increased number of therapeutic targets and novel improved drug delivery methodologies the market for peptide drugs is growing considerably faster than overall pharmaceuticals. Currently hundreds of these therapeutic peptides and peptidomimetics are being tested in clinical phases and a steadily growing number are finally reaching the market.

Sigma-Aldrich® is proud to offer you a choice of more than 2400 amino acid derivatives to construct and tailor your peptides. Furthermore, you will be able to obtain all of the necessary tools for solution or solid phase peptide synthesis from a convenient, single source.

Matthias Junkers
Product Manager

This issue of ChemFiles can only display a small fraction of the broad Sigma-Aldrich portfolio and will focus on recent additions to our unnatural amino acids offering, a convenient listing of most needed, essential amino acid building blocks, and innovative new tools for PEGylation. For a complete list of available building blocks and reagents, please visit *sigma-aldrich.com/chemprod*. If you are unable to find the specific building block or reagent for your needs, "Please Bother Us" with your suggestions at *matthias.junkers@sial.com*, or contact your local Sigma-Aldrich office (see back cover).

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About Our Cover

The cover structure depicts the α,α-disubstituted amino acid (*R*)-allylalanine (Aldrich **690902**) as a representative example of the innovative new additions to Sigma-Aldrich's portfolio of amino acid building blocks. The olefin moiety in the side chain of this unnatural amino acid can be used to synthesize a plethora of different products. Incorporated into a peptide the olefin moiety offers a unique handle with an orthogonal functionality.

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Vol. 8 No. 7

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Unnatural Amino Acids

Unnatural amino acids, the non-proteinogenic amino acids that either occur naturally or are chemically synthesized, are becoming more and more important as tools for modern drug discovery research. Due to their unlimited structural diversity and functional versatility, they are widely used as chiral building blocks and molecular scaffolds in constructing combinatorial libraries.[1] They represent a powerful tool in drug discovery when incorporated into therapeutic peptidomimetics and peptide analogs. Used as molecular probes they can help to better understand the function of biological systems.[2]

Peptidomimetics have found widespread recognition as surrogates for therapeutic peptides derived from proteinacious amino acids because they may show improved *in vivo* stability, enhanced potency, better oral absorption, improved tissue distribution, and increased selectivity of biological response. In this context, unnatural amino acids can be used to alter the tertiary structure of a peptide. Side chain modifications allow the design of drug candidates with a perfect match to their biological target.

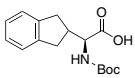
Sigma-Aldrich® is dedicated to becoming a strong partner for your Drug Discovery research by offering a broad and unique range of unnatural amino acid building blocks. In this section you will find recent additions to our amino acid portfolio including derivatives of glycine, phenylglycine, alanine, phenylalanine, and innovative α,α-disubstituted amino acids, as well as a comprehensive listing of proline derivatives and β-amino acids.

References: (1) Ma, J.S. *Chem. Today* **2003**, 65. (2) Dougherty, D.A. *Curr Opin Chem Biol.* **2000**, *6*, 645.

Glycine & Phenylglycine Derivatives

Boc-(2-indanyl)-Gly-OH, ≥98.0% (HPLC) NEW

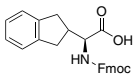
Boc-(2-indanyl)-L-glycine
[181227-47-4]
$C_{16}H_{21}NO_4$
FW 291.34



669792-500MG	500 mg

Fmoc-(2-indanyl)-Gly-OH, ≥98.0% (HPLC) NEW

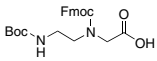
Fmoc-(2-indanyl)-L-glycine
[205526-39-2]
$C_{26}H_{23}NO_4$
FW 413.47



669903-500MG	500 mg

Fmoc-*N*-(2-Boc-aminoethyl)-Gly-OH, ≥97.0% (HPLC)

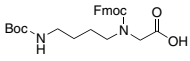
Fmoc-*N*-(2-Boc-aminoethyl)glycine
[141743-15-9]
$C_{24}H_{28}N_2O_6$
FW 440.49



670316-500MG	500 mg

Fmoc-*N*-(4-Boc-aminobutyl)-Gly-OH, ≥98.0% (HPLC) NEW

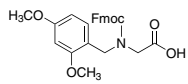
Fmoc-*N*-(4-Boc-aminobutyl)glycine;
Fmoc-Nlys(Boc)-OH
[171856-09-0]
$C_{26}H_{32}N_2O_6$
FW 468.54



670413-500MG	500 mg

Fmoc-*N*-(2,4-dimethoxybenzyl)-Gly-OH, ≥98.0% (HPLC) NEW

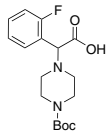
Fmoc-*N*-(2,4-dimethoxybenzyl)glycine;
Fmoc-Dmb-Gly-OH
[166881-42-1]
$C_{26}H_{25}NO_6$
FW 447.48



689459-250MG	250 mg
689459-1G	1 g

2-(4-Boc-piperazino)-2-(2-fluorophenyl)acetic acid, ≥97.0% (HPLC)

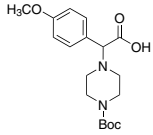
$C_{17}H_{23}FN_2O_4$
FW 338.37



12234-250MG-F	250 mg
12234-1G-F	1 g

2-(4-Boc-piperazino)-2-(4-methoxyphenyl)acetic acid, ≥97.0% (HPLC)

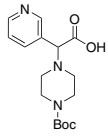
[868260-17-7]



16297-250MG-F	250 mg
16297-1G-F	1 g

2-(4-Boc-piperazino)-2-(3-pyridyl)acetic acid, ≥97.0% (HPLC)

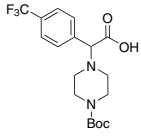
$C_{16}H_{23}N_3O_4$
FW 321.37



16762-250MG-F	250 mg
16762-1G-F	1 g

2-(4-Boc-piperazino)-2-[4-(trifluoromethyl)phenyl]acetic acid, ≥97.0% (HPLC)

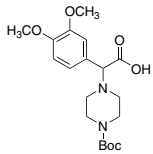
$C_{18}H_{23}F_3N_2O_4$
FW 388.38



28963-250MG-F	250 mg
28963-1G-F	1 g

2-(4-Boc-piperazino)-2-(3,4-dimethoxyphenyl)acetic acid, ≥97.0% (HPLC)

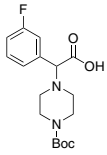
$C_{19}H_{28}N_2O_6$
FW 380.44



30096-250MG-F	250 mg
30096-1G-F	1 g

2-(4-Boc-piperazino)-2-(3-fluorophenyl)acetic acid, ≥97.0% (HPLC)

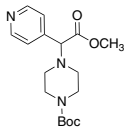
$C_{17}H_{23}FN_2O_4$
FW 338.37



39563-250MG-F	250 mg
39563-1G-F	1 g

Methyl 2-(4-Boc-piperazino)-2-(4-pyridyl)acetate, ≥90% (HPLC)

2-(4-Boc-piperazino)-2-(4-pyridyl)acetic acid methyl ester
$C_{17}H_{25}N_3O_4$
FW 335.40

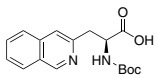


68892-250MG-F	250 mg
68892-1G-F	1 g

Alanine Derivatives

Boc-β-2-quinolyl)-Ala-OH, ≥98.0% (HPLC) NEW

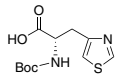
Boc-3-(2-quinolyl)-L-alanine;
(*S*)-2-(Boc-amino)-3-(2-quinolyl)propionic acid
[161453-37-8]
$C_{17}H_{20}N_2O_4$
FW 316.35



670456-500MG	500 mg

Boc-β-(4-thiazolyl)-Ala-OH, ≥98.0% (HPLC) NEW

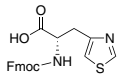
Boc-3-(4-thiazolyl)-L-alanine;
(*S*)-2-(Boc-amino)-3-(4-thiazolyl)propionic acid
[119434-75-2]
$C_{11}H_{16}N_2O_4S$
FW 272.32



670553-1G	1 g

Fmoc-β-(4-thiazolyl)-Ala-OH, ≥98.0% (HPLC) NEW

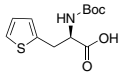
(*S*)-2-(Fmoc-amino)-3-(4-thiazolyl)propionic acid;
Fmoc-3-(4-thiazolyl)-L-alanine
[205528-32-1]
$C_{21}H_{18}N_2O_4S$
FW 394.44



670677-500MG	500 mg

Boc-β-(2-thienyl)-D-Ala-OH, ≥98.0% (HPLC) NEW

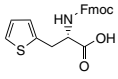
(*R*)-2-(Boc-amino)-3-(2-thienyl)propionic acid;
Boc-3-(2-thienyl)-D-alanine
[78452-55-8]
$C_{12}H_{17}NO_4S$
FW 271.33



670782-1G	1 g

Fmoc-β-(2-thienyl)-Ala-OH, ≥98.0% (HPLC) NEW

(*S*)-2-(Fmoc-amino)-3-(2-thienyl)propionic acid;
Fmoc-3-(2-thienyl)-L-alanine
[130309-35-2]
$C_{22}H_{19}NO_4S$
FW 393.46

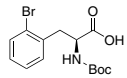


670898-1G	1 g

Phenylalanine Derivatives

Boc-Phe(2-Br)-OH, ≥98.0% (HPLC) NEW

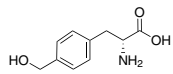
Boc-2-bromo-L-phenylalanine
[261165-02-0]
$C_{14}H_{18}BrNO_4$
FW 344.20



672203-500MG	500 mg

4-(Hydroxymethyl)-D-phenylalanine, ≥97.0% (HPLC)

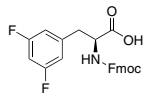
(*R*)-2-Amino-3-[4-(hydroxymethyl)phenyl]propionic acid
[15720-17-9]
$C_{10}H_{13}NO_3$
FW 195.22



43667-500MG	500 mg

Fmoc-Phe(3,5-F_2)-OH, ≥98.0% (HPLC) NEW

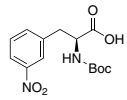
Fmoc-3,5-difluoro-L-phenylalanine
[205526-24-5]
$C_{24}H_{19}F_2NO_4$
FW 423.41



669687-500MG	500 mg

Boc-Phe(3-NO_2)-OH, ≥98.0% (HPLC) NEW

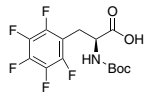
Boc-3-nitro-L-phenylalanine
[131980-29-5]
$C_{14}H_{18}N_2O_6$
FW 310.30



670014-1G	1 g

Boc-pentafluoro-L-phenylalanine, ≥98.0% (HPLC) NEW

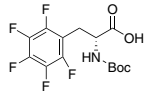
(*S*)-2-(Boc-amino)-3-(pentafluorophenyl)propionic acid
[34702-60-8]
$C_{14}H_{14}F_5NO_4$
FW 355.26



670138-1G	1 g

Boc-pentafluoro-D-phenylalanine, ≥98.0% (HPLC) NEW

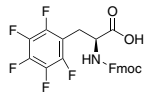
(*R*)-2-(Boc-amino)-3-(pentafluorophenyl)propionic acid
[136207-26-6]
$C_{14}H_{14}F_5NO_4$
FW 355.26



670235-1G	1 g

Fmoc-pentafluoro-L-phenylalanine, ≥98.0% (HPLC) NEW

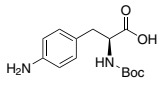
(*S*)-2-(Fmoc-amino)-3-(pentafluorophenyl)propionic acid
[205526-32-5]
$C_{24}H_{16}F_5NO_4$
FW 477.38



670340-500MG	500 mg

Boc-Phe(4-NH_2)-OH, ≥98.0% (HPLC) NEW

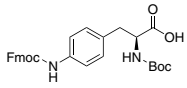
Boc-4-amino-L-phenylalanine
[55533-24-9]
$C_{14}H_{20}N_2O_4$
FW 280.32



671770-500MG	500 mg

Boc-4-(Fmoc-amino)-L-phenylalanine, ≥98.0% (HPLC) NEW

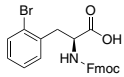
[114346-31-5]
$C_{29}H_{30}N_2O_6$
FW 502.56



671886-500MG	500 mg

Fmoc-Phe(2-Br)-OH, ≥98.0% (HPLC) NEW

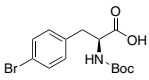
Fmoc-2-bromo-L-phenylalanine
[220497-47-2]
$C_{24}H_{20}BrNO_4$
FW 466.32



672319-500MG	500 mg

Boc-Phe(4-Br)-OH, ≥98.0% (HPLC) NEW

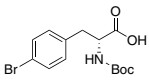
Boc-4-bromo-L-phenylalanine
[62129-39-9]
$C_{14}H_{18}BrNO_4$
FW 344.20



672424-1G	1 g

Boc-D-Phe(4-Br)-OH, ≥98.0% (HPLC) NEW

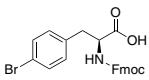
Boc-4-bromo-D-phenylalanine
[79561-82-3]
$C_{14}H_{18}BrNO_4$
FW 344.20



672521-1G	1 g

Fmoc-Phe(4-Br)-OH, ≥98.0% (HPLC) NEW

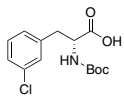
Fmoc-4-bromo-L-phenylalanine
[198561-04-5]
$C_{24}H_{20}BrNO_4$
FW 466.32



672637-1G	1 g

Boc-D-Phe(3-Cl)-OH, ≥98.0% (HPLC) NEW

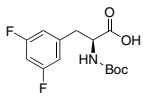
Boc-3-chloro-D-phenylalanine
[80102-25-6]
$C_{14}H_{18}ClNO_4$
FW 299.75



672750-1G	1 g

Boc-Phe(3,5-F_2)-OH, ≥98.0% (HPLC) NEW

Boc-3,5-difluoro-L-phenylalanine
[205445-52-9]
$C_{14}H_{17}F_2NO_4$
FW 301.29

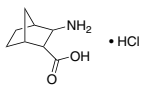


669563-500MG	500 mg

Miscellaneous Amino Acids

(*cis*)-3-Aminobicyclo[2.2.1]heptane-2-carboxylic acid hydrochloride, ≥98.0% (TLC)

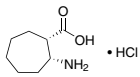
(*cis*)-2-Amino-3-carboxybicyclo[2.2.1]heptane hydrochloride
$C_8H_{13}NO_2 \cdot HCl$
FW 191.66



08356-1G-F	1 g

cis-2-Aminocycloheptanecarboxylic acid hydrochloride, ≥98.0% (TLC)

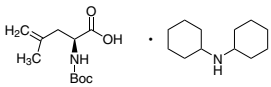
$C_8H_{15}NO_2 \cdot HCl$
FW 193.67



11252-500MG-F	500 mg

Boc-4,5-dehydro-Leu-OH (dicyclohexylammonium) salt, ≥96.0% (HPLC)

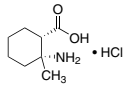
Boc-4,5-dehydro-L-leucine (dicyclohexylammonium) salt;
(*S*)-2-(Boc-amino)-4-methyl-4-pentenoic acid (dicyclohexylammonium) salt
[87720-54-5]
$C_{11}H_{19}NO_4 \cdot C_{12}H_{23}N$
FW 410.59



11578-50MG	50 mg

cis-2-Amino-2-methylcyclohexanecarboxylic acid hydrochloride, ≥98.0% (CHN)

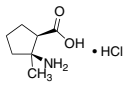
[202921-88-8]
$C_8H_{15}NO_2 \cdot HCl$
FW 193.67



30254-500MG-F	500 mg

cis-2-Amino-2-methylcyclopentanecarboxylic acid hydrochloride, ≥98.0% (CHN)

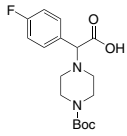
[156292-34-1]
$C_7H_{13}NO_2 \cdot HCl$
FW 179.64



39927-500MG-F	500 mg

2-(4-Boc-piperazino)-2-(4-fluorophenyl)acetic acid, ≥97.0% (HPLC)

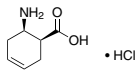
$C_{17}H_{23}FN_2O_4$
FW 338.37



44264-250MG-F	250 mg
44264-1G-F	1 g

cis-6-Amino-3-cyclohexene-1-carboxylic acid hydrochloride, ≥97.0% (AT)

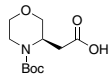
cis-2-Amino-4-cyclohexene-1-carboxylic acid hydrochloride
[57266-56-5]
$C_7H_{11}NO_2 \cdot HCl$
FW 177.63



54105-250MG	250 mg
54105-1G	1 g

(*R*)-4-Boc-3-morpholineacetic acid, 98%

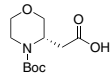
(*R*)-1-Boc-morpholin-3-ylacetic acid;
(*R*)-*N*-Boc-3-carboxymethyl-morpholine
[761460-03-1]
$C_{11}H_{19}NO_5$
FW 245.27



669830-250MG	250 mg
669830-1G	1 g

(*S*)-4-Boc-3-morpholineacetic acid, 98%

(*S*)-1-Boc-morpholin-3-ylacetic acid;
(*S*)-*N*-Boc-3-carboxymethyl-morpholine
[839710-38-2]
$C_{11}H_{19}NO_5$
FW 245.27



669954-250MG	250 mg
669954-1G	1 g

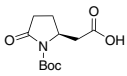
(*S*)-*N*-Boc-1,2,3,6-tetrahydro-2-pyridinecarboxylic acid, ≥98.0% (HPLC)

(*S*)-*N*-Boc-1,2,3,6-Tetrahydro-2-picolinic acid
[417726-36-4]
$C_{11}H_{17}NO_4$
FW 227.26

670286-250MG	250 mg
670286-1G	1 g

Boc-beta-Homopyr-OH, ≥99.0% (HPLC)

(*S*)-(1-Boc-5-oxo-pyrrolidin-2-yl)acetic acid
[948594-96-5]
$C_{11}H_{17}NO_5$
FW 243.26

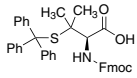


670618-250MG	250 mg
670618-1G	1 g

Fmoc-Pen(Trt)-OH, 96%

NEW

Fmoc-*S*-trityl-L-penicillamine;
Fmoc-β,β-dimethyl-Cys(Trt)-OH
[201531-88-6]
$C_{39}H_{35}NO_4S$
FW 613.76
≥95.5% (HPLC)

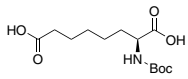


670642-500MG	500 mg

(*S*)-2-(Boc-amino)octanedioic acid, 97%

NEW

Boc-L-2-aminosuberic acid
[66713-87-9]
$C_{13}H_{23}NO_6$
FW 289.32
≥96.5% (GCF)

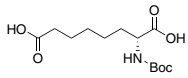


671983-250MG	250 mg
671983-1G	1 g

(*R*)-2-(Boc-amino)octanedioic acid, 99%

NEW

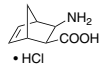
Boc-D-2-aminosuberic acid
[75113-71-2]
$C_{13}H_{23}NO_6$
FW 289.32
≥98.5% (GC)



672092-250MG	250 mg
672092-1G	1 g

exo-cis-3-Aminobicyclo[2.2.1]hept-5-ene-2-carboxylic acid hydrochloride, ≥97.0% (AT)

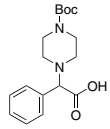
[947601-81-2]
$C_8H_{11}NO_2 \cdot HCl$
FW 189.64



94927-250MG	250 mg
94927-1G	1 g

2-(4-Boc-piperazino)-2-phenylacetic acid, ≥97.0% (HPLC)

$C_{17}H_{24}N_2O_4$
FW 320.38

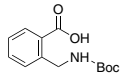


16298-500MG-F	500 mg

2-(Boc-aminomethyl)benzoic acid, 98%

NEW

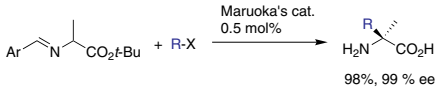
Boc-Oamb
[669713-61-5]
$C_{13}H_{17}NO_4$
FW 251.28
≥97.5% (HPLC)



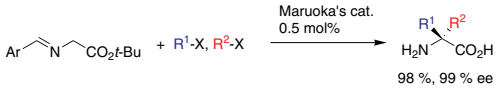
711659-500MG	500 mg

Nagase α,α-disubstituted Amino Acids

Chiral quaternary ammonium catalysts can be particularly useful in the field of asymmetric synthesis. Keji Maruoka and co-workers from Kyoto University have reported potent C_2-symmetric ammonium salts that catalyze alkylation reactions under remarkably low catalyst loadings.[3] Nagase, in close cooperation with Prof. Maruoka has applied his methodology in industrially viable procedures to synthesize α–monosubstituted and novel α,α-disubstituted α–amino acids by alkylation of alanine- (**Scheme 1**) and glycine-derived (**Scheme 2**) Schiff bases with alkyl halides. Research quantities of novel Nagase α,α-disubstituted amino acids are now available through Sigma-Aldrich®. Enantiopure allylalanines for example will open pathways to completely new structures. Rutjes and co-workers have already shown that the comparable allylglycine is a remarkable precursor for the synthesis of a broad range of building blocks.[4]



Scheme 1

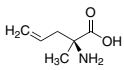


Scheme 2

References: (3)(a) Kitamura, M. et al. *Angew. Chem. Int. Ed.* **2005**, *44*, 1549. (b) Ooi, T.; Maruoka, K. *Aldrichimica Acta* **2007**, *40*, 77. (4)(a) Rutjes, F.P.J.T. et al. *J. Org. Biol. Chem.* **2005**, *3*, 3435. (b) Rutjes, F.P.J.T. et al. *J. Chem. Soc., Perkin Trans. 1* **2000**, 4197.

(*S*)-(–)-α-Allylalanine NEW

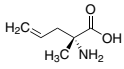
(*S*)-2-Amino-2-methyl-4-pentenoic acid
[96886-55-4]
$C_6H_{11}NO_2$
FW 129.16



691011-100MG	100 mg
691011-500MG	500 mg

(*R*)-(+)-α-Allylalanine NEW

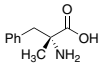
(R)-2-Amino-2-methyl-4-pentenoic acid
[96886-56-5]
$C_6H_{11}NO_2$
FW 129.16



690902-100MG	100 mg
690902-500MG	500 mg

α-Methyl-D-phenylalanine, ≥98.0% (HPLC) NEW

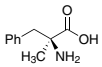
(*R*)-(+)-2-Amino-2-methyl-3-phenylpropionic acid;
α-Me-D-Phe-OH
[17350-84-4]
$C_{10}H_{13}NO_2$
FW 179.22



690791-250MG	250 mg

α-Methyl-L-phenylalanine, ≥98.0% (HPLC) NEW

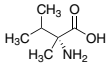
(*S*)-(–)-2-Amino-2-methyl-3-phenylpropionic acid;
α-Me-Phe-OH
[23239-35-2]
$C_{10}H_{13}NO_2$
FW 179.22



690694-100MG	100 mg
690694-500MG	500 mg

(*R*)-(+)-α-Methylvaline, 99% NEW

α-Me-D-Val-OH; α-Methyl-D-valine
[53940-82-2]
$C_6H_{13}NO_2$
FW 131.17

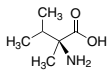


▶ **≥98.5% (TLC)**

690589-100MG	100 mg
690589-500MG	500 mg

(*S*)-(–)-α-Methylvaline, 99% NEW

α-Methyl-L-valine; α-Me-Val-OH
[53940-83-3]
$C_6H_{13}NO_2$
FW 131.17

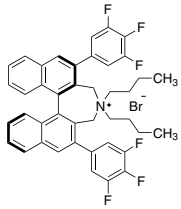


▶ **≥98.5% (TLC)**

690465-500MG	500 mg

(11b*R*)-(–)-4,4-Dibutyl-4,5-dihydro-2,6-bis(3,4,5-trifluorophenyl)-3*H*-dinaphth[2,1-*c*:1′,2′-*e*]azepinium bromide NEW

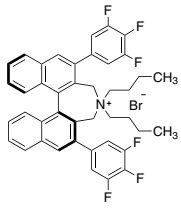
[887938-70-7]
$C_{42}H_{36}BrF_6N$
FW 748.64



687596-50MG	50 mg

(11b*S*)-(+)-4,4-Dibutyl-4,5-dihydro-2,6-bis(3,4,5-trifluorophenyl)-3*H*-dinaphth[2,1-*c*:1′,2′-*e*]azepinium bromide NEW

[851942-89-7]
$C_{42}H_{36}BrF_6N$
FW 748.64



677086-50MG	50 mg

Proline Derivatives

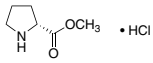
Proline is a non-polar, natural amino acid that forms a tertiary amide when incorporated into peptides. Thus, it is the only proteinogenic amino acid that does not act as a hydrogen bond donor in a peptide chain. Proline is known as a classical breaker of both the α-helical and β-sheet secondary structures in proteins and peptides, and it plays a crucial role in protein folding. Synthetic proline derivatives, mimetics and analogs offer further options to tune the biological, pharmaceutical, or physicochemical properties of peptides and proteins.

In recent years proline derivatives and analogs have also found increasing popularity as organocatalysts in asymmetric synthesis.[5]

References: (5)(a) Vignola, N.; List, B. *J. Am. Chem. Soc.* **2003**, *125*, 450. (b) Dalko, P.I.; Moisan, L.; *Angew. Chem. Int. Ed.* **2004**, *43*, 5138.

D-Proline methyl ester hydrochloride, ≥98.0% (AT) NEW

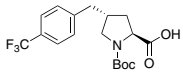
$C_6H_{11}NO_2 \cdot HCl$
FW 165.62



689491-1G	1 g
689491-5G	5 g

Boc-(*R*)-4-[4-(trifluoromethyl)benzyl]-L-proline, ≥98.0% (HPLC)

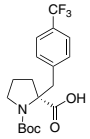
[957311-17-0]
$C_{18}H_{22}F_3NO_4$
FW 373.37



01336-500MG-F	500 mg

Boc-(*S*)-α-(4-trifluoromethylbenzyl)-Pro-OH, ≥98.0% (HPLC)

Boc-α-(4-trifluormethylbenzyl)-D-proline; (*S*)-1-Boc-2-(4-trifluoromethylbenzyl)-2-pyrrolidinecarboxylic acid
$C_{18}H_{22}F_3NO_4$
FW 373.37



05199-500MG-F	500 mg

Boc-(*S*)-α-allyl-Pro-OH, ≥98.0% (HPLC)

Boc-α-allyl-D-proline;
(*S*)-2-Allyl-1-Boc-2-pyrrolidinecarboxylic acid
[706806-59-9]
$C_{13}H_{21}NO_4$
FW 255.31

06486-500MG-F	500 mg

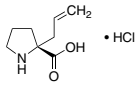
Boc-(*R*)-α-allyl-Pro-OH, ≥98.0% (HPLC)

Boc-α-allyl-L-proline;
(*R*)-2-Allyl-1-Boc-2-pyrrolidinecarboxylic acid
[144085-23-4]
$C_{13}H_{21}NO_4$
FW 255.31

06538-500MG-F	500 mg

(*R*)-α-Allyl-proline hydrochloride, ≥98.0% (TLC)

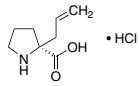
α-Allyl-L-proline hydrochloride;
(*R*)-2-Allyl-2-pyrrolidinecarboxylic acid hydrochloride
[177206-69-8]
$C_8H_{13}NO_2 \cdot HCl$
FW 191.66



06541-500MG-F	500 mg

(*S*)-α-Allyl-proline hydrochloride, ≥98.0% (TLC)

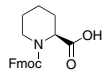
α-Allyl-D-proline hydrochloride;
(*S*)-2-Allyl-2-pyrrolidinecarboxylic acid hydrochloride
[129704-91-2]
$C_8H_{13}NO_2 \cdot HCl$
FW 191.66



06594-500MG-F	500 mg

Fmoc-Pip-OH, ≥98.0% (HPLC)

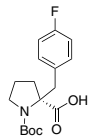
(*S*)-1-Fmoc-piperidine-2-carboxylic acid;
N-Fmoc-L-pipecolinic acid
[86069-86-5]
$C_{21}H_{21}NO_4$
FW 351.40



09777-1G	1 g

Boc-(*S*)-α-(4-fluorobenzyl)-Pro-OH, ≥98.0% (HPLC)

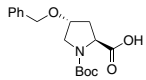
Boc-α-(4-fluorobenzyl)-D-proline;
(*S*)-1-Boc-2-(4-fluorobenzyl)-2-pyrrolidinecarboxylic acid
[706806-65-7]
$C_{17}H_{22}FNO_4$
FW 323.36



14931-500MG-F	500 mg

Boc-Hyp(Bzl)-OH, ≥98.0% (HPLC)

Boc-*O*-benzyl-L-hydroxyproline
[54631-81-1]
$C_{17}H_{23}NO_5$
FW 321.37



15535-5G	5 g

α-Methyl-L-proline, ≥98.0% (TLC)

[42856-71-3]
$C_6H_{11}NO_2$
FW 129.16

17249-250MG	250 mg
17249-1G	1 g

L-Pipecolic acid, 99% (titration)

L-Homoproline; (*S*)-(–)-2-Piperidinecarboxylic acid
[3105-95-1]
$C_6H_{11}NO_2$
FW 129.16

P2519-100MG	100 mg
P2519-250MG	250 mg
P2519-1G	1 g

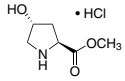
D-Pipecolinic acid, 99%

(*R*)-(+)-2-Piperidinecarboxylic acid;
(*R*)-Piperidine-2-carboxylic acid; D-Homoproline
[1723-00-8]
$C_6H_{11}NO_2$
FW 129.16

268062-25MG	25 mg
268062-100MG	100 mg

L-4-Hydroxyproline methyl ester hydrochloride, ≥98.0% (TLC)

[40216-83-9]
$C_6H_{11}NO_3 \cdot HCl$
FW 181.62



30681-5G	5 g

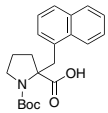
Boc-α-(diphenylmethyl)-DL-Pro-OH, ≥90% (HPLC)

Boc-α-(diphenylmethyl)-DL-proline; Boc-α-(benzhydryl)-DL-proline; 1-Boc-2-(diphenylmethyl)-2-pyrrolidinecarboxylic acid
[351002-64-7]
$C_{23}H_{27}NO_4$
FW 381.46

30763-500MG	500 mg

Boc-α-(1-naphthylmethyl)-DL-Pro-OH, ≥96.0% (HPLC)

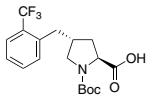
Boc-α-(1-naphthylmethyl)-DL-proline;
1-Boc-2-(1-naphthylmethyl)-2-pyrrolidinecarboxylic acid
[351002-65-8]
$C_{21}H_{25}NO_4$
FW 355.43



36748-500MG	500 mg

Boc-(*R*)-4-[2-(trifluoromethyl)benzyl]-L-proline, ≥98.0% (HPLC)

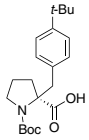
$C_{18}H_{22}F_3NO_4$
FW 373.37



38455-500MG-F	500 mg

Boc-(*S*)-α-(4-*tert*-butylbenzyl)-Pro-OH, ≥98.0% (HPLC)

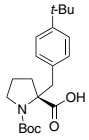
Boc-α-(4-*tert*-butylbenzyl)-D-proline;
(*S*)-1-Boc-2-(4-*tert*-butylbenzyl)-2-pyrrolidinecarboxylic acid
$C_{21}H_{31}NO_4$
FW 361.48



39166-500MG-F	500 mg

Boc-(*R*)-α-(4-*tert*-butylbenzyl)-Pro-OH, ≥97.0% (HPLC)

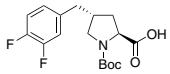
(*R*)-1-Boc-2-(4-*tert*-butylbenzyl)-2-pyrrolidinecarboxylic acid;
Boc-α-(4-*tert*-butylbenzyl)-L-proline
$C_{21}H_{31}NO_4$
FW 361.48



39793-500MG-F	500 mg

Boc-(*R*)-4-(3,4-difluorobenzyl)-L-proline, ≥97.0% (HPLC)

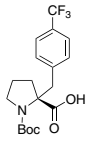
(2*S*,4*R*)-1-Boc-4-(3,4-difluorobenzyl)-2-pyrrolidine-carboxylic acid
$C_{17}H_{21}F_2NO_4$
FW 341.35



40372-500MG-F	500 mg

Boc-(*R*)-α-(4-trifluoromethylbenzyl)-Pro-OH, ≥98.0% (HPLC)

Boc-α-(4-trifluoromethylbenzyl)-L-proline; (*R*)-1-Boc-2-(4-trifluoromethylbenzyl)-2-pyrrolidinecarboxylic acid
$C_{18}H_{22}F_3NO_4$
FW 373.37



42004-500MG-F	500 mg

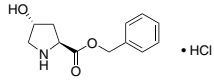
cis-3-Hydroxy-DL-proline, 95%

(±)-*cis*-3-Hydroxypyrrolidine-2-carboxylic acid
[4298-05-9]
$C_5H_9NO_3$
FW 131.13

420174-10MG	10 mg

L-4-Hydroxy-proline benzyl ester hydrochloride, ≥98.0% (HPLC)

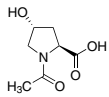
[62147-27-7]
$C_{12}H_{15}NO_3 \cdot HCl$
FW 257.71



43746-5G	5 g

trans-1-Acetyl-4-hydroxy-L-proline, 99%

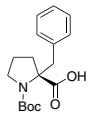
N-Acetyl-L-hydroxyproline
[33996-33-7]
$C_7H_{11}NO_4$
FW 173.17



441562-500MG	500 mg
441562-10G	10 g

Boc-(*R*)-α-benzyl-Pro-OH, ≥99.0% (HPLC)

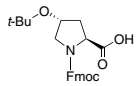
Boc-α-benzyl L-proline;
(*R*)-2-Benzyl-1-Boc-2-pyrrolidinecarboxylic acid
[706806-60-2]
$C_{17}H_{23}NO_4$
FW 305.37



47079-500MG-F	500 mg

Fmoc-Hyp(tBu)-OH, ≥98.0% (HPLC)

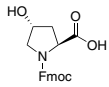
Fmoc-*O*-*tert*-butyl-L-hydroxyproline
[122996-47-8]
$C_{24}H_{27}NO_5$
FW 409.47



47517-5G-F	5 g

Fmoc-Hyp-OH, ≥98.0% (HPLC, sum of enantiomers)

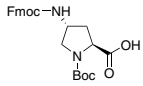
Fmoc-L-4-hydroxyproline
[88050-17-3]
$C_{20}H_{19}NO_5$
FW 353.37



47686-5G	5 g

N-Boc-*trans*-4-*N*-Fmoc-amino-L-proline, 97%

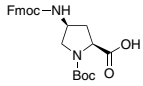
(2*S*,4*R*)-*N*-(*tert*-Butoxycarbonyl)-4-*N*-(9-fluorenyl-methoxycarbonyl)aminopyrrolidine-2-carboxylic acid
[176486-63-8]
$C_{25}H_{28}N_2O_6$
FW 452.50



534390-1G	1 g

N-Boc-*cis*-4-*N*-Fmoc-amino-L-proline, 97%

(2*S*,4*S*)-*N*-*tert*-Butoxycarbonyl-4-*N*-(9-fluorenyl-methoxycarbonyl)aminopyrrolidine-2-carboxylic acid
[174148-03-9]
$C_{25}H_{28}N_2O_6$
FW 452.50



534404-1G	1 g

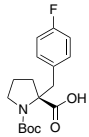
Boc-α-allyl-DL-Pro-OH, ≥96.0% (HPLC)

Boc-α-allyl-DL-proline;
2-Allyl-1-Boc-2-pyrrolidinecarboxylic acid
[315234-49-2]
$C_{13}H_{21}NO_4$
FW 255.31

58147-500MG	500 mg

Boc-(*R*)-α-(4-fluorobenzyl)-Pro-OH, ≥98.0% (HPLC)

Boc-α-(4-fluorobenzyl)-L-proline;
(*R*)-1-Boc-2-(4-fluorobenzyl)-2-pyrrolidinecarboxylic acid
[706806-64-6]
$C_{17}H_{22}FNO_4$
FW 323.36



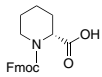
67420-500MG-F	500 mg

Boc-α-Me-DL-Pro-OH, ≥96.0% (HPLC)

Boc-α-methyl-DL-proline;
1-Boc-2-methyl-2-pyrrolidinecarboxylic acid
[203869-80-1]
$C_{11}H_{19}NO_4$
FW 229.27

68691-500MG	500 mg

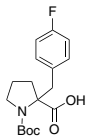
Fmoc-D-Pip-OH, ≥98.0% (HPLC)



(*R*)-N-Fmoc-piperidine-2-carboxylic acid;
N-Fmoc-D-pipecolic acid
[101555-63-9]
$C_{21}H_{21}NO_4$
FW 351.40

73418-1G	1 g

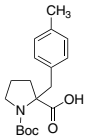
Boc-α-(4-fluorobenzyl)-DL-Pro-OH, ≥96.0% (HPLC)



Boc-α-(4-fluorobenzyl)-DL-proline
[351002-78-3]
$C_{17}H_{22}FNO_4$
FW 323.36

74082-500MG	500 mg

Boc-α-(4-methylbenzyl)-DL-Pro-OH, ≥96.0% (HPLC)



Boc-α-(4-methylbenzyl)-DL-proline;
1-Boc-2-(4-methylbenzyl)-2-pyrrolidinecarboxylic acid
[351002-82-9]
$C_{18}H_{25}NO_4$
FW 319.40

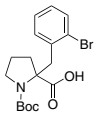
76501-500MG	500 mg

Boc-(*S*)-α-benzyl-Pro-OH, ≥97.0% (HPLC)

Boc-α-benzyl-D-proline;
(S)-2-Benzyl-1-Boc-2-pyrrolidinecarboxylic acid
[706806-61-3]
$C_{17}H_{23}NO_4$
FW 305.37

76896-500MG-F	500 mg

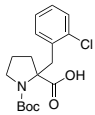
Boc-α-(2-bromobenzyl)-DL-Pro-OH, ≥96.0% (HPLC)



Boc-α-(2-bromobenzyl)-DL-proline;
1-Boc-2-(2-bromobenzyl)-2-pyrrolidinecarboxylic acid
[351002-85-2]
$C_{17}H_{22}BrNO_4$
FW 384.26

90682-500MG	500 mg

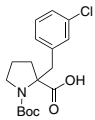
Boc-α-(2-chlorobenzyl)-DL-Pro-OH, ≥96.0% (HPLC)



Boc-α-(2-chlorobenzyl)-DL-proline;
1-Boc-2-(2-chlorobenzyl)-2-pyrrolidinecarboxylic acid
[351002-86-3]
$C_{17}H_{22}ClNO_4$
FW 339.81

90683-500MG	500 mg

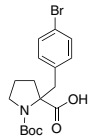
Boc-α-(3-chlorobenzyl)-DL-Pro-OH, ≥96.0% (HPLC)



1-Boc-2-(3-chlorobenzyl)-2-pyrrolidinecarboxylic acid;
Boc-α-(3-chlorobenzyl)-DL-proline
[351002-87-4]
$C_{17}H_{22}ClNO_4$
FW 339.81

90684-500MG	500 mg

Boc-α-(4-bromobenzyl)-DL-Pro-OH, ≥96.0% (HPLC)



Boc-α-(4-bromobenzyl)-DL-proline;
1-Boc-2-(4-bromobenzyl)-2-pyrrolidinecarboxylic acid
[336817-91-5]
$C_{17}H_{22}BrNO_4$
FW 384.26

94866-500MG	500 mg

Boc-α-propyl-DL-Pro-OH, ≥90% (HPLC)

Boc-α-propyl-DL-proline
[351002-88-5]
$C_{13}H_{23}NO_4$
FW 257.33

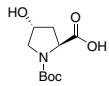
95566-500MG	500 mg

Boc-α-benzyl-DL-Pro-OH, ≥96.0% (HPLC)

Boc-α-benzyl-DL-proline;
1-Boc-2-benzyl-2-pyrrolidinecarboxylic acid
[351002-72-7]
$C_{17}H_{23}NO_4$
FW 305.37

52969-500MG	500 mg

Boc-Hyp-OH, ≥98.0% (TLC)



Boc-L-hydroxyproline;
trans-*N*-(*tert*-Butoxycarbonyl)-4-hydroxy-L-proline
[13726-69-7]
$C_{10}H_{17}NO_5$
FW 231.25

15544-5G	5 g
15544-25G	25 g

N-Boc-2-piperidinecarboxylic acid, 98%

Boc-DL-Pip-OH; (±)-1-Boc-piperidine-2-carboxylic acid;
N-Boc-DL-pipecolinic acid
[98303-20-9]
$C_{11}H_{19}NO_4$
FW 229.27

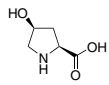
495875-10G	10 g
495875-50G	50 g

(*R*)-(+)-*N*-Boc-2-piperidinecarboxylic acid, 98%

Boc-D-Pip-OH; *N*-Boc-D-pipecolic acid; (+)-*N*-Boc-(*R*)-pipecolinic acid; (*R*)-*N*-Boc-piperidine-2-carboxylic acid;
(*R*)-(+)-1-(*tert*-Butoxycarbonyl)-2-piperidinecarboxylic acid
[28697-17-8]
$C_{11}H_{19}NO_4$
FW 229.27

516341-5G	5 g

cis-4-Hydroxy-L-proline



(2*S*,4*S*)-(–)-4-Hydroxy-2-pyrrolidinecarboxylic acid
[618-27-9]
$C_5H_9NO_3$
FW 131.13

H1637-50MG	50 mg
H1637-250MG	250 mg
H1637-1G	1 g

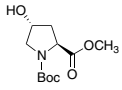
Boc-Pip-OH, 98%

(*S*)-1-Boc-piperidine-2-carboxylic acid; *N*-Boc-L-pipecolinic acid;
(*S*)-(–)-1-(*tert*-Butoxycarbonyl)-2-piperidinecarboxylic acid
[26250-84-0]
$C_{11}H_{19}NO_4$
FW 229.27

516368-1G	1 g
516368-5G	5 g
516368-25G	25 g

N-Boc-*trans*-4-hydroxy-L-proline methyl ester, 97%

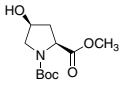
[74844-91-0]
$C_{11}H_{19}NO_5$
FW 245.27



639737-1G	1 g
639737-5G	5 g

N-Boc-*cis*-4-hydroxy-L-proline methyl ester, 97%

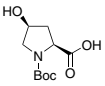
[102195-79-9]
$C_{11}H_{19}NO_5$
FW 245.27



654000-1G	1 g
654000-5G	5 g

N-Boc-*cis*-4-Hydroxy-L-proline, 97%

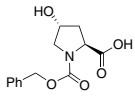
N-Boc-*cis*-4-hydroxypyrrolidine-2-carboxylic acid
[87691-27-8]
$C_{10}H_{17}NO_5$
FW 231.25



654019-1G	1 g
654019-5G	5 g

Z-Hyp-OH, ≥99.0% (T)

Z-L-4-Hydroxyproline; *N*-Cbz-Hydroxy-L-proline
[13504-85-3]
$C_{13}H_{15}NO_5$
FW 265.26



96310-5G	5 g
96310-25G	25 g

Pipecolinic acid, 98%

Homoproline; 2-Piperidinecarboxylic acid;
Pipecolic acid free base; (±)-Piperidine-2-carboxylic acid
[535-75-1]
$C_6H_{11}NO_2$
FW 129.16

P45850-25G	25 g
P45850-100G	100 g

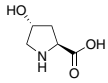
3,4-Dehydro-DL-proline, 98%

(±)-3-Pyrroline-2-carboxylic acid;
(±)-2,5-Dihydro-1*H*-pyrrole-2-carboxylic acid
[3395-35-5]
$C_5H_7NO_2$
FW 113.11

862126-100MG	100 mg

trans-4-Hydroxy-L-proline, ≥99%

Hyp; (2*S*,4*R*)-4-Hydroxypyrrolidine-2-carboxylic acid
[51-35-4]
$C_5H_9NO_3$
FW 131.13



H54409-2.5G	2.5 g
H54409-10G	10 g
H54409-25G	25 g
H54409-100G	100 g

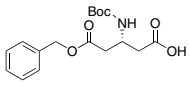
β-Amino Acids and Homologs

Although they are less abundant than their α-analogues, β-amino acids occur in nature both in free form and bound to peptides. Oligomers composed exclusively of β-amino acids (so-called β-peptides) might be the most thoroughly investigated peptidomimetics. Besides being remarkably stable to metabolism, exhibiting slow microbial degradation, and inherently stable to proteases and peptidases, they fold into well-ordered secondary structures consisting of helices, turns, and sheets. In this respect, the most intriguing effects have been observed when β²-amino acids are present in the β-peptide backbone.[6] A whole new "world" has emerged from the design of fascinating new peptidic macromolecules from β- and γ-homologated proteinogenic amino acids and other components.[7] Sigma-Aldrich® is proud to be a leading supplier of β-amino acids. This ChemFiles presents a comprehensive list of available products.

References: (6) Lelais, G.; Seebach, D. *Biopolymers* **2004**, *76*, 206. (7) Seebach, D.; Beck, A.K.; Bierbaum, D.J. *Chem. & Biodiv.* **2004**, *1*, 1111.

Boc-β-Glu(OBzl)-OH, ≥98.0% (HPLC)

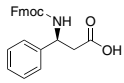
'Boc-L-β-homoaspartic acid 5-benzyl ester';
Boc-L-β-glutamic acid 5-benzyl ester
[254101-10-5]
$C_{17}H_{23}NO_6$
FW 337.37



03691-1G	1 g

Fmoc-β-D-Phe-OH, ≥98.0% (HPLC)

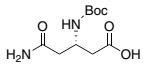
(*S*)-3-(Fmoc-amino)-3-phenylpropionic acid;
Fmoc-D-β-phenylalanine
[209252-15-3]
$C_{24}H_{21}NO_4$
FW 387.43



00396-100MG	100 mg

Boc-β-Gln-OH, ≥98.0% (TLC)

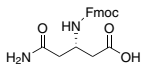
'N_β-Boc-L-β-homoasparagine'; N_β-Boc-L-β-glutamine;
(*S*)-3-(Boc-amino)pentanoic acid 5-amide
$C_{10}H_{18}N_2O_5$
FW 246.26



03651-1G	1 g

Fmoc-β-Gln-OH, ≥97.0% (HPLC)

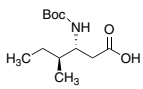
N_β-Fmoc-L-β-homoasparagine; N_β-Fmoc-L-β-glutamine;
(*S*)-3-(Fmoc-amino)pentanoic acid 5-amide
[283160-18-9]
$C_{20}H_{20}N_2O_5$
FW 368.38



03652-1G	1 g

Boc-β-Homoile-OH, ≥98.0% (TLC)

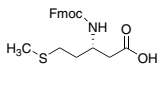
(3*R*,4*S*)-3-(Boc-amino)-4-methylhexanoic acid;
Boc-L-β-homoisoleucine
[218608-82-3]
$C_{12}H_{23}NO_4$
FW 245.32



03654-250MG	250 mg

Fmoc-β-Homomet-OH, ≥97.0% (HPLC)

(*R*)-3-(Fmoc-amino)-5-(methylthio)pentanoic acid;
Fmoc-L-β-homomethionine
[266359-48-2]
$C_{21}H_{23}NO_4S$
FW 385.48



03658-1G	1 g

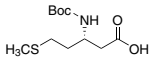
(S)-(+)-Pyrrolidine-3-carboxylic acid, ≥98.0% (NT) NEW

(*S*)-β-Proline
[72580-53-1]
$C_5H_9NO_2$
FW 115.13

670871-500MG	500 mg

Boc-β-Homomet-OH, ≥98.0% (TLC)

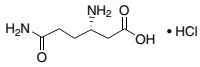
(*R*)-3-(Boc-amino)-5-(methylthio)pentanoic acid;
Boc-L-β-homomethionine
[244251-20-5]
$C_{11}H_{21}NO_4S$
FW 263.35



03661-1G	1 g

L-β-Homoglutamine hydrochloride, ≥98.0% (TLC)

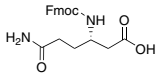
(*S*)-3-Aminoadipic acid 6-amide hydrochloride
$C_6H_{12}N_2O_3 \cdot HCl$
FW 196.63



03663-1G	1 g

Fmoc-β-Homogln-OH, ≥98.0% (HPLC)

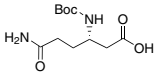
(*S*)-3-(Fmoc-amino)adipic acid 6-amide;
N_β-Fmoc-L-β-homoglutamine
[283160-17-8]
$C_{21}H_{22}N_2O_5$
FW 382.41



03666-1G	1 g

Boc-β-Homogln-OH, ≥98.0% (TLC)

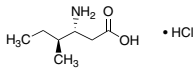
(*S*)-3-(Boc-amino)adipic acid 6-amide;
N_β-Boc-L-β-homoglutamine
$C_{11}H_{20}N_2O_5$
FW 260.29



03667-1G	1 g

L-β-Homoisoleucine hydrochloride, ≥98.0% (TLC)

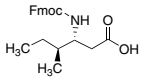
(3R,4S)-3-Amino-4-methylhexanoic acid hydrochloride
[219310-10-8]
$C_7H_{15}NO_2 \cdot HCl$
FW 181.66



03669-250MG	250 mg

Fmoc-β-Homoile-OH, ≥98.0% (HPLC)

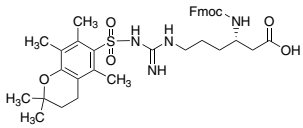
(3*R*,4*S*)-3-(Fmoc-amino)-4-methylhexanoic acid;
Fmoc-L-β-homoisoleucine
[193954-27-7]
$C_{22}H_{25}NO_4$
FW 367.44



03671-1G	1 g

Fmoc-β-Homoarg(Pmc)-OH, ≥95.0% (HPLC)

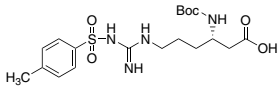
N_β-Fmoc-N_ω-(2,2,5,7,8-pentamethylchromane-6-sulfonyl)-L-β-homoarginine
$C_{36}H_{44}N_4O_7S$
FW 676.82



03673-100MG	100 mg
03673-500MG	500 mg

Boc-β-Homoarg(Tos)-OH, ≥98.0% (TLC)

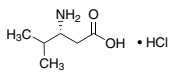
N_β-Boc-N_ω-tosyl-L-β–homoarginine
[136271-81-3]
$C_{19}H_{30}N_4O_6S$
FW 442.53



03674-1G	1 g

L-β-Leucine hydrochloride, ≥98.0% (TLC)

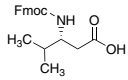
'L-β-Homovaline' hydrochloride; (*R*)-3-Amino-4-methylpentanoic acid hydrochloride
[219310-09-5]
$C_6H_{13}NO_2 \cdot HCl$
FW 167.63



03675-250MG	250 mg
03675-1G	1 g

Fmoc-β-Leu-OH, ≥97.0% (HPLC)

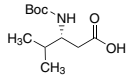
Fmoc-L-β-homovaline; Fmoc-L-β-leucine;
(*R*)-3-(Fmoc-amino)-4-methylpentanoic acid
[172695-33-9]
$C_{21}H_{23}NO_4$
FW 353.41



03676-1G	1 g

Boc-β-Leu-OH, ≥98.0% (TLC)

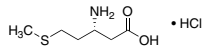
Boc-L-β-homovaline; Boc-L-β-leucine;
(*R*)-3-(Boc-amino)-4-methylpentanoic acid
[183990-64-9]
$C_{11}H_{21}NO_4$
FW 231.29



03678-1G	1 g

L-β-Homomethionine hydrochloride, ≥98.0% (TLC)

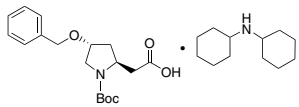
R-3-Amino-5-(methylthio)pentanoic acid hydrochloride
$C_6H_{13}NO_2S \cdot HCl$
FW 199.70



03681-1G	1 g

Boc-β-Homohyp(Bzl)-OH (dicyclohexylammonium) salt, ≥85% (HPLC)

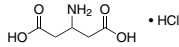
Boc-*O*-benzyl-L-β-homohydroxy-proline (dicyclohexylammonium) salt;
(2*S*,4*R*)-1-Boc-4-benzyloxy-pyrrolidine-2-acetic acid (dicyclohexylammonium) salt
$C_{18}H_{25}NO_5 \cdot C_{12}H_{23}N$
FW 516.71



03683-1G	1 g

β-Glutamic acid hydrochloride, ≥98.0% (TLC)

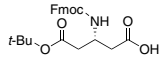
3-Aminoglutaric acid hydrochloride;
'β-Homoaspartic acid' hydrochloride
$C_5H_9NO_4 \cdot HCl$
FW 183.59



03688-500MG	500 mg

Fmoc-β-Glu(OtBu)-OH, ≥98.0% (HPLC)

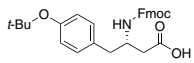
Fmoc-L-β-glutamic acid 5-*tert*-butyl ester;
Fmoc-L-β-homoaspartic acid 5-*tert*-butyl ester
[209252-17-5]
$C_{24}H_{27}NO_6$
FW 425.47



03689-1G	1 g

Fmoc-β-Homotyr(tBu)-OH, ≥98.0% (HPLC)

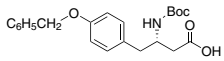
Fmoc-*O*-*tert*-butyl-L-β-homotyrosine
[219967-69-8]
$C_{29}H_{31}NO_5$
FW 473.56



03692-1G	1 g

Boc-β-Homotyr(Bzl)-OH, ≥97.0% (HPLC)

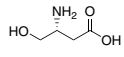
Boc-*O*-benzyl-L-β-homotyrosine
[126825-16-9]
$C_{22}H_{27}NO_5$
FW 385.45



03693-1G	1 g

L-β-Homoserine, ≥98.0% (TLC)

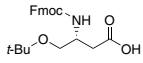
(*R*)-3-Amino-4-hydroxybutyric acid
[16504-56-6]
$C_4H_9NO_3$
FW 119.12



03694-100MG	100 mg
03694-500MG	500 mg

Fmoc-β-Homoser(tBu)-OH, ≥97.5% (HPLC)

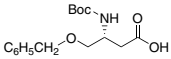
Fmoc-*O*-*tert*-butyl-L-β-homoserine
[203854-51-7]
$C_{23}H_{27}NO_5$
FW 397.46



03696-1G	1 g

Boc-β-Homoser(Bzl)-OH, ≥98.0% (HPLC)

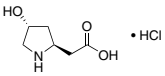
Boc-*O*-benzyl-L-β-homoserine
[218943-31-8]
$C_{16}H_{23}NO_5$
FW 309.36



03697-1G	1 g

L-β-Homohydroxyproline hydrochloride, ≥98.0% (TLC)

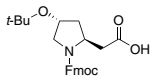
(2*S*,4*R*)-4-Hydroxy-2-pyrrolidinylacetic acid hydrochloride
$C_6H_{11}NO_3 \cdot HCl$
FW 181.62



03698-100MG	100 mg
03698-500MG	500 mg

Fmoc-β-Homohyp(*t*Bu)-OH, ≥98.0% (HPLC)

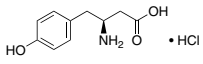
Fmoc-*O*-*tert*-butyl-L-β-homohydroxyproline
[957509-29-4]
$C_{25}H_{29}NO_5$
FW 423.50



03751-500MG	500 mg

L-β-Homotyrosine hydrochloride, ≥97.0% (HPLC)

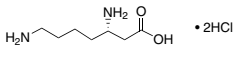
(*S*)-3-Amino-4-(4-hydroxyphenyl)butyric acid hydrochloride
$C_{10}H_{13}NO_3 \cdot HCl$
FW 231.68



03758-100MG	100 mg

L-β-Homolysine dihydrochloride, ≥98.0% (TLC)

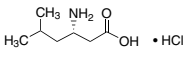
(*S*)-3,7-Diaminoheptanoic acid dihydrochloride
$C_7H_{16}N_2O_2 \cdot 2HCl$
FW 233.14



03759-100MG	100 mg

L-β-Homoleucine hydrochloride, ≥98.0% (TLC)

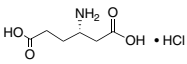
(*S*)-3-Amino-5-methylhexanoic acid hydrochloride
[96386-92-4]
$C_7H_{15}NO_2 \cdot HCl$
FW 181.66



03764-1G	1 g

L-β-Homoglutamic acid hydrochloride, ≥98.0% (TLC)

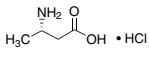
(*S*)-3-Aminoadipic acid hydrochloride;
(*S*)-3-Aminohexanedioic acid hydrochloride
[61884-74-0]
$C_6H_{11}NO_4 \cdot HCl$
FW 197.62



03765-100MG	100 mg

L-β-Homoalanine hydrochloride, ≥98.0% (TLC)

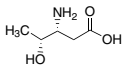
(*S*)-3-Aminobutyric acid hydrochloride
[58610-41-6]
$C_4H_9NO_2 \cdot HCl$
FW 139.58



03766-250MG	250 mg

L-β-Homothreonine, ≥98.0% (TLC)

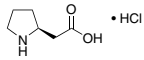
(3R,4R)-3-Amino-4-hydroxypentanoic acid
$C_5H_{11}NO_3$
FW 133.15



03767-100MG	100 mg

'L-β-Homoproline' hydrochloride, ≥98.0% (TLC)

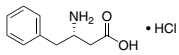
(*S*)-2-(2-Pyrrolidinyl)acetic acid hydrochloride
[53912-85-9]
$C_6H_{11}NO_2 \cdot HCl$
FW 165.62



03768-250MG	250 mg
03768-1G	1 g

L-β-Homophenylalanine hydrochloride, ≥98.0% (TLC)

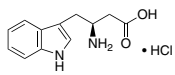
(*S*)-3-Amino-4-phenylbutyric acid hydrochloride
[138165-77-2]
$C_{10}H_{13}NO_2 \cdot HCl$
FW 215.68



03769-250MG	250 mg

L-β-Homotryptophan hydrochloride, ≥98.0% (TLC)

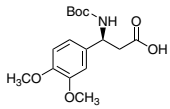
(*S*)-3-Amino-4-(3-indolyl)butyric acid hydrochloride
$C_{12}H_{14}N_2O_2 \cdot HCl$
FW 254.71



03790-100MG	100 mg

(*S*)-Boc-3,4-dimethoxy-β-Phe-OH, ≥98.0% (HPLC)

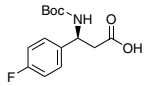
(*S*)-3-(Boc-amino)-3-(3,4-methoxyphenyl)propionic acid; Boc-3,4-dimethoxy-D-β-phenylalanine
[499995-84-5]
$C_{16}H_{23}NO_6$
FW 325.36



04542-500MG-F	500 mg

(*S*)-Boc-4-fluoro-β-Phe-OH, ≥98.0% (HPLC)

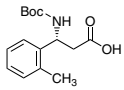
(*S*)-3-(Boc-amino)-3-(4-fluorophenyl)propionic acid; Boc-4-fluoro-D-β-phenylalanine
[479064-88-5]
$C_{14}H_{18}FNO_4$
FW 283.30



05102-500MG-F	500 mg

(*R*)-Boc-2-methyl-β-Phe-OH, ≥98.0% (HPLC)

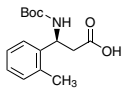
(*R*)-3-(Boc-amino)-3-(2-methylphenyl)propionic acid; Boc-2-methyl-L-β-phenylalanine
[500770-86-5]
$C_{15}H_{21}NO_4$
FW 279.33



06731-500MG-F	500 mg

(*S*)-Boc-2-methyl-β-Phe-OH, ≥98.0% (HPLC)

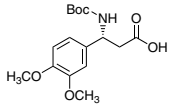
(*S*)-3-(Boc-amino)-3-(2-methylphenyl)propionic acid; Boc-2-methyl-D-β-phenylalanine
[499995-74-3]
$C_{15}H_{21}NO_4$
FW 279.33



06939-500MG-F	500 mg

(*R*)-Boc-3,4-dimethoxy-β-Phe-OH, ≥98.0% (HPLC)

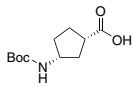
(*R*)-3-(Boc-amino)-3-(3,4-methoxyphenyl)propionic acid; Boc-3,4-dimethoxy-L-β-phenylalanine
[500788-93-2]
$C_{16}H_{23}NO_6$
FW 325.36



08009-500MG-F	500 mg

(1*S*,3*R*)-(+)-3-(Boc-amino)cyclopentanecarboxylic acid, ≥96.0% (TLC)

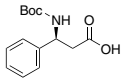
[261165-05-3]
$C_{11}H_{19}NO_4$
FW 229.27



09784-500MG	500 mg

Boc-D-β-Phe-OH, ≥98.0% (HPLC)

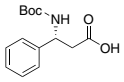
(*S*)-3-(Boc-amino)-3-phenylpropionic acid;
Boc-D-β-phenylalanine
[103365-47-5]
$C_{14}H_{19}NO_4$
FW 265.30



09793-1G	1 g

Boc-β-Phe-OH, ≥96.0% (HPLC)

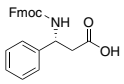
Boc-L-β-phenylalanine;
(*R*)-3-(Boc-amino)-3-phenylpropionic acid
[161024-80-2]
$C_{14}H_{19}NO_4$
FW 265.30



09794-250MG	250 mg
09794-1G	1 g

Fmoc-β-Phe-OH, ≥98.0% (HPLC)

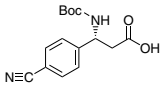
(*R*)-3-(Fmoc-amino)-3-phenylpropionic acid;
Fmoc-L-β-phenylalanine
[220498-02-2]
$C_{24}H_{21}NO_4$
FW 387.43



09795-500MG	500 mg

(*R*)-Boc-4-cyano-β-Phe-OH, ≥98.0% (HPLC)

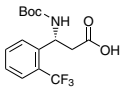
(*R*)-3-(Boc-amino)-3-(4-cyanophenyl)propionic acid;
Boc-4-cyano-L-β-phenylalanine
[501015-22-1]
$C_{15}H_{18}N_2O_4$
FW 290.31



12339-500MG-F	500 mg

(*R*)-Boc-2-(trifluoromethyl)-β-Phe-OH, ≥98.0% (HPLC)

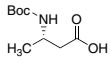
(*R*)-3-(Boc-amino)-3-[2-(trifluoromethyl)phenyl]propionic acid; Boc-2-(trifluoromethyl)-L-β-phenylalanine
[501015-17-4]
$C_{15}H_{18}F_3NO_4$
FW 333.30



14670-500MG-F	500 mg

Boc-β-Homoala-OH, ≥98.0% (TLC)

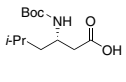
(*S*)-3-(Boc-amino)butyric acid; Boc-L-β-homoalanine
[158851-30-0]
$C_9H_{17}NO_4$
FW 203.24



14974-250MG	250 mg
14974-1G	1 g

Boc-β-Homoleu-OH, ≥98.0% (TLC)

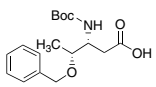
(*S*)-3-(Boc-amino)-5-methylhexanoic acid;
Boc-L-β-homoleucine
[132549-43-0]
$C_{12}H_{23}NO_4$
FW 245.32



14975-1G	1 g

Boc-β-Homothr(Bzl)-OH, ≥98.0% (TLC)

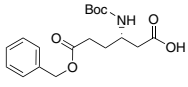
(3*R*,4*R*)-4-Benzyloxy-3-(Boc-amino)pentanoic acid;
Boc-*O*-benzyl-L-β-homothreonine
$C_{17}H_{25}NO_5$
FW 323.38



14976-1G	1 g

Boc-β-Homoglu(OBzl)-OH, ≥98.0% (TLC)

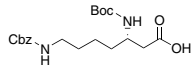
(*S*)-3-(Boc-amino)adipic acid 6-benzyl ester;
Boc-L-β-homoglutamic acid 6-benzyl ester
[218943-30-7]
$C_{18}H_{25}NO_6$
FW 351.39



14977-1G	1 g

Boc-β-Homolys(Z)-OH, ≥98.0% (TLC)

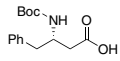
(*S*)-3-(Boc-amino)-7-(Z-amino)heptanoic acid;
N_β-Boc-N_ω-Z-L-β-homolysine
$C_{20}H_{30}N_2O_6$
FW 394.46



14978-1G	1 g

Boc-β-Homophe-OH, ≥98.0% (TLC)

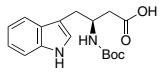
(*S*)-3-(Boc-amino)-4-phenylbutyric acid;
Boc-L-β-homophenylalanine
[51871-62-6]
$C_{15}H_{21}NO_4$
FW 279.33



14979-250MG	250 mg
14979-1G	1 g

Boc-β-Homotrp-OH, ≥98.0% (TLC)

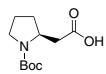
(*S*)-3-(Boc-amino)-4-(3-indolyl)butyric acid;
N_β-Boc-L-β-homotryptophan
[229639-48-9]
$C_{17}H_{22}N_2O_4$
FW 318.37



14981-250MG	250 mg

Boc-β³-Homopro-OH, ≥98.0% (TLC)

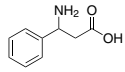
(*S*)-2-(1-Boc-2-pyrrolidinyl)acetic acid; Boc-L-β³-homoproline
[56502-01-3]
$C_{11}H_{19}NO_4$
FW 229.27



14982-250MG	250 mg
14982-1G	1 g

DL-β-Phenylalanine, 98%

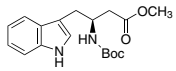
DL-β-Homophenylglycine; ±-3-Amino-3-phenylpropionic acid; β-Aminohydrocinnamic acid; DL-3-Amino-3-phenylpropionic acid
[614-19-7]
$C_9H_{11}NO_2$
FW 165.19



159492-1G	1 g
159492-5G	5 g
159492-25G	25 g

Boc-β-Homotrp-OMe, ≥98.0% (TLC)

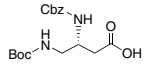
N_β-Boc-L-β-homotryptophan methyl ester
$C_{18}H_{24}N_2O_4$
FW 332.39



17008-250MG	250 mg

Z-β-Dab(Boc)-OH, ≥98.0% (TLC)

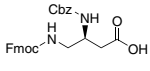
Z-β-Dbu(Boc)-OH; N_β-Z-N_γ-Boc-L-3,4-diaminobutyric acid; (*R*)-4-(Boc-amino)-3-(Z-amino)butyric acid;
N_γ-Boc-N_β-Z-L-3,4-diaminobutyric acid
[108919-51-3]
$C_{17}H_{24}N_2O_6$
FW 352.38



17974-1G	1 g

Z-D-β-Dab(Fmoc)-OH, ≥98.0% (HPLC)

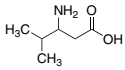
β-Z-γ-Fmoc-D-3,4-diaminobutyric acid; (*S*)-4-(Fmoc-amino)-3-(Z-amino)butyric acid; γ-Fmoc-β-Z-D-3,4-diaminobutyric acid; Z-D-β-Dbu(Fmoc)-OH
$C_{27}H_{26}N_2O_6$
FW 474.51



17984-1G	1 g

DL-β-Leucine, ≥98.0% (NT)

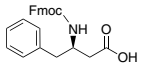
(±)-3-Amino-4-methylpentanoic acid;
(±)-3-Amino-4-methylvaleric acid
[5699-54-7]
$C_6H_{13}NO_2$
FW 131.17



17988-1G-F	1 g

Fmoc-D-β-Homophe-OH, ≥97.0% (HPLC)

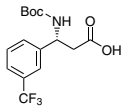
Fmoc-D-β-homophenylalanine;
(R)-3-(Fmoc-amino)-4-phenylbutyric acid
[209252-16-4]
$C_{25}H_{23}NO_4$
FW 401.45



18074-500MG-F	500 mg

(R)-Boc-3-(trifluoromethyl)-β-Phe-OH, ≥95.0% (HPLC)

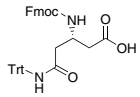
(*R*)-3-(Boc-amino)-3-[3-(trifluoromethyl)phenyl]propionic acid; Boc-3-(trifluoromethyl)-L-β-phenylalanine
[501015-18-5]
$C_{15}H_{18}F_3NO_4$
FW 333.30



18328-500MG-F	500 mg

Fmoc-β-Gln(Trt)-OH, ≥96.0% (HPLC)

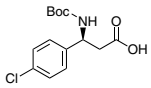
Fmoc-β-Homoasn(Trt)-OH; N_β-Fmoc-N_δ-trityl-L-homoasparagine; (*S*)-3-(Fmoc-amino)-*N*-trityl-valeric acid 5-amide
[283160-20-3]
$C_{39}H_{34}N_2O_5$
FW 610.70



18505-1G-F	1 g

(S)-Boc-4-chloro-β-Phe-OH, ≥98.0% (HPLC)

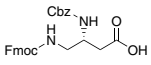
(*S*)-3-(Boc-amino)-3-(4-chlorophenyl)propionic acid; Boc-4-chloro-D-β-phenylalanine
[479064-90-9]
$C_{14}H_{18}ClNO_4$
FW 299.75



19343-500MG-F	500 mg

Z-β-Dab(Fmoc)-OH, ≥98.0% (HPLC)

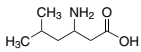
Z-β-Dbu(Fmoc)-OH; (*R*)-4-(Fmoc-amino)-3-(Z-amino) butyric acid; γ-Fmoc-β-Z-L-3,4-diaminobutyric acid; β-Z-γ-Fmoc-L-3,4-diaminobutyric acid
[349547-09-7]
$C_{27}H_{26}N_2O_6$
FW 474.51



21622-1G	1 g

DL-β-Homoleucine, ≥99.0% (NT)

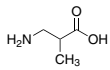
(±)-3-Amino-5-methylcaproic acid;
(±)-3-Amino-5-methylhexanoic acid
[3653-34-7]
$C_7H_{15}NO_2$
FW 145.20



21625-1G	1 g
21625-5G	5 g

DL-3-Aminoisobutyric acid, 98%

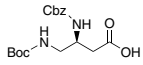
α-Methyl-β-alanine
[144-90-1]
$C_4H_9NO_2$
FW 103.12



217794-1G	1 g
217794-5G	5 g

Z-D-β-Dab(Boc)-OH, ≥98.0% (TLC)

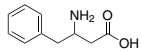
Z-D-β-Dbu(Boc)-OH; (*S*)-4-(Boc-amino)-3-(Z-amino) butyric acid; N_γ-Boc-N_β-Z-D-3,4-diaminobutyric acid; N_β-Z-N_γ-Boc-D-3,4-diamino-buttersäure
[96186-30-0]
$C_{17}H_{24}N_2O_6$
FW 352.38



28206-250MG	250 mg

DL-β-Homophenylalanine, ≥98.0% (HPLC)

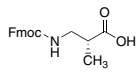
(±)-3-Amino-4-phenylbutyric acid
[15099-85-1]
$C_{10}H_{13}NO_2$
FW 179.22



28217-1G-F	1 g
28217-5G-F	5 g

(R)-3-(Fmoc-amino)-2-methylpropionic acid, ≥95.0% (HPLC)

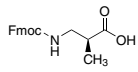
(*R*)-Fmoc-β²-Homoala-OH
[211682-15-4]
$C_{19}H_{19}NO_4$
FW 325.36



30975-500MG-F	500 mg

(S)-3-(Fmoc-amino)-2-methylpropionic acid, ≥95.0% (HPLC)

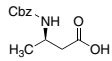
(*S*)-Fmoc-β²-Homoala-OH
[203854-58-4]
$C_{19}H_{19}NO_4$
FW 325.36



38811-500MG-F	500 mg

Z-β-D-Homoala-OH, ≥98.0% (HPLC)

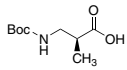
Z-β-D-homoalanine; (*R*)-3-(Z-amino)butyric acid
[67843-72-5]
$C_{12}H_{15}NO_4$
FW 237.25



39748-250MG-F	250 mg
39748-1G-F	1 g

(S)-3-(Boc-amino)-2-methylpropionic acid, ≥98.0% (TLC)

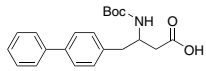
(*S*)-Boc-β²-Homoala-OH
[190897-47-3]
$C_9H_{17}NO_4$
FW 203.24



40195-500MG-F	500 mg

(±)-3-(Boc-amino)-4-(4-biphenylyl)butyric acid, ≥98.0% (HPLC)

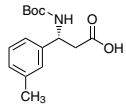
Boc-4′-phenyl-DL-β-homophenylalanine
[683219-74-1]
$C_{21}H_{25}NO_4$
FW 355.43



41844-500MG-F	500 mg

(R)-Boc-3-methyl-β-Phe-OH, ≥98.0% (HPLC)

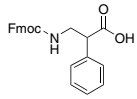
(*R*)-3-(Boc-amino)-3-(3-methylphenyl)propionic acid; Boc-3-methyl-L-β-phenylalanine
[464930-76-5]
$C_{15}H_{21}NO_4$
FW 279.33



42722-500MG-F	500 mg

(±)-3-(Fmoc-amino)-2-phenylpropionic acid, ≥95.0% (HPLC)

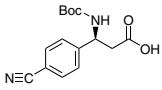
(±)-Fmoc-2-phenyl-β-alanine; Fmoc-β²-DL-Homophe-OH
[683217-60-9]
$C_{24}H_{21}NO_4$
FW 387.43



43026-500MG-F	500 mg

(*S*)-Boc-4-cyano-β-Phe-OH, ≥98.0% (HPLC)

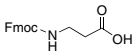
(*S*)-3-(Boc-amino)-3-(4-cyanophenyl)propionic acid; Boc-4-cyano-D-β-phenylalanine
[500770-82-1]
$C_{15}H_{18}N_2O_4$
FW 290.31



44376-500MG-F	500 mg

Fmoc-β-Ala-OH, ≥99.0% (HPLC)

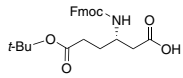
Fmoc-β-alanine
[35737-10-1]
$C_{18}H_{17}NO_4$
FW 311.33



47587-1G-F	1 g
47587-5G-F	5 g
47587-25G-F	25 g

Fmoc-β-Homoglu(OtBu)-OH, ≥98.0% (HPLC)

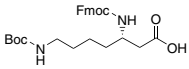
(*S*)-3-(Fmoc-amino)adipic acid 6-*tert*-butyl ester; Fmoc-L-β-homoglutamic acid 6-*tert*-butyl ester
[203854-49-3]
$C_{25}H_{29}NO_6$
FW 439.50



47837-1G	1 g

Fmoc-β-Homolys(Boc)-OH, ≥95.0% (TLC)

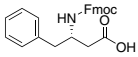
(*S*)-7-(Boc-amino)-3-(Fmoc-amino)heptanoic acid; N_β-Fmoc-N_ω-Boc-L-β-homolysine
[203854-47-1]
$C_{27}H_{34}N_2O_6$
FW 482.57



47874-1G	1 g

Fmoc-β-Homophe-OH, ≥95.0% (HPLC)

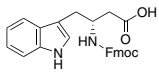
(*S*)-3-(Fmoc-amino)-4-phenylbutyric acid; Fmoc-L-β-homophenylalanine
[193954-28-8]
$C_{25}H_{23}NO_4$
FW 401.45



47878-1G-F	1 g

Fmoc-β-Homotrp-OH, ≥96.0% (HPLC)

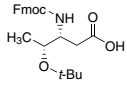
(*S*)-3-(Fmoc-amino)-4-(3-indolyl)butyricacid; N_β-Fmoc-L-β-homotryptophan
$C_{27}H_{24}N_2O_4$
FW 440.49



47901-1G	1 g

Fmoc-β-Homothr(tBu)-OH, ≥96.0% (HPLC)

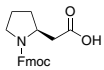
(3*R*,4*R*)-4-*tert*-Butoxy-3-(Fmoc-amino)pentanoic acid; Fmoc-*O*-*tert*-butyl-L-β-homothreonine
$C_{24}H_{29}NO_5$
FW 411.49



47911-1G	1 g

Fmoc-L-β³-homoproline, ≥98.0% (HPLC)

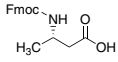
(*S*)-2-(1-Fmoc-2-pyrrolidinyl)acetic acid
[193693-60-6]
$C_{21}H_{21}NO_4$
FW 351.40



47912-1G	1 g

Fmoc-β-Homoala-OH, ≥98.0% (HPLC)

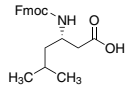
(*S*)-3-(Fmoc-amino)butyric acid; Fmoc-L-β-homoalanine
[193954-26-6]
$C_{19}H_{19}NO_4$
FW 325.36



47935-1G	1 g

Fmoc-β-Homoleu-OH, ≥96.0% (HPLC)

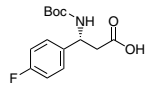
Fmoc-L-β-homoleucine; (*S*)-3-(Fmoc-amino)-5-methyl-hexanoic acid
[193887-44-4]
$C_{22}H_{25}NO_4$
FW 367.44



47946-250MG	250 mg
47946-1G	1 g

(*R*)-Boc-4-fluoro-β-Phe-OH, ≥98.0% (HPLC)

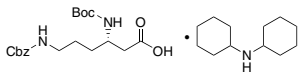
(*R*)-3-(Boc-amino)-3-(4-fluorophenyl)propionic acid; Boc-4-fluoro-L-β-phenylalanine
[479064-94-3]
$C_{14}H_{18}FNO_4$
FW 283.30



51006-500MG-F	500 mg

Boc-β-Lys(Z)-OH (dicyclohexylammonium) salt, ≥98.0% (TLC)

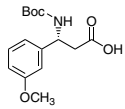
Boc-L-β-Homoorn(Z)-OH (dicyclohexylammonium) salt; N_β-Boc-N_ω-Z-L-β-lysine (dicyclohexylammonium) salt
$C_{19}H_{28}N_2O_6 \cdot C_{12}H_{23}N$
FW 561.75



52136-1G	1 g

(*R*)-Boc-3-methoxy-β-Phe-OH, ≥98.0% (HPLC)

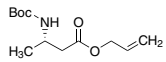
(*R*)-3-(Boc-amino)-3-(3-methoxyphenyl)propionic acid; Boc-3-methoxy-L-β-phenylalanine
[500788-86-3]
$C_{15}H_{21}NO_5$
FW 295.33



52169-500MG-F	500 mg

Boc-β-Homoala-OAll, ≥98.0% (TLC)

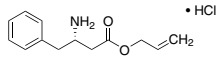
(*S*)-3-(Boc-amino)butyric acid allyl ester; Boc-L-β-homoalanine allyl ester
$C_{12}H_{21}NO_4$
FW 243.30



53458-1G	1 g

L-β-Homophenylalanine allyl ester hydrochloride, ≥98.0% (TLC)

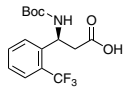
Allyl (S)-3-amino-4-phenylbutyrate hydrochloride
$C_{13}H_{17}NO_2 \cdot HCl$
FW 255.74



53575-1G	1 g

(*S*)-Boc-2-(trifluoromethyl)-β-Phe-OH, ≥98.0% (HPLC)

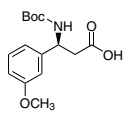
(*S*)-3-(Boc-amino)-3-[2-(trifluoromethyl)phenyl]propionic acid; Boc-2-(trifluormethyl)-D-β-phenylalanine
[500770-77-4]
$C_{15}H_{18}F_3NO_4$
FW 333.30



55685-500MG-F	500 mg

(*S*)-Boc-3-methoxy-β-Phe-OH, ≥98.0% (HPLC)

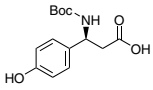
(*S*)-3-(Boc-amino)-3-(3-methoxyphenyl)propionic acid; Boc-3-methoxy-D-β-phenylalanine
[499995-77-6]
$C_{15}H_{21}NO_5$
FW 295.33



55894-500MG-F	500 mg

(*S*)-Boc-β-Tyr-OH, ≥98.0% (HPLC)

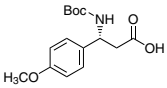
(*S*)-3-(Boc-amino)-3-(4-hydroxyphenyl)propionic acid; Boc-D-β-tyrosine
[499995-80-1]
$C_{14}H_{19}NO_5$
FW 281.30



56996-500MG-F	500 mg

(*R*)-Boc-4-methoxy-β-Phe-OH, ≥98.0% (HPLC)

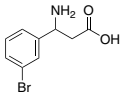
(*R*)-3-(Boc-amino)-3-(4-methoxyphenyl)propionic acid; Boc-β-Tyr(Me)-OH; Boc-4-methoxy-L-β-phenylalanine; Boc-*O*-methyl-L-β-tyrosine
[500788-87-4]
$C_{15}H_{21}NO_5$
FW 295.33



56999-500MG-F	500 mg

3-Amino-3-(3-bromophenyl)propionic acid, 97%

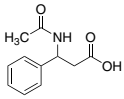
[117391-50-1]
$C_9H_{10}BrNO_2$
FW 244.09



573450-1G	1 g

N-Acetyl-DL-β-phenylalanine, ≥97.0% (HPLC)

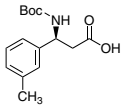
(±)-3-(Acetylamino)-3-phenylpropionic acid
[40638-98-0]
$C_{11}H_{13}NO_3$
FW 207.23



59891-250MG-F	250 mg

(*S*)-Boc-3-methyl-β-Phe-OH, ≥98.0% (HPLC)

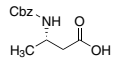
(*S*)-3-(Boc-amino)-3-(3-methylphenyl)propionic acid; Boc-3-methyl-D-β-phenylalanine
[499995-75-4]
$C_{15}H_{21}NO_4$
FW 279.33



59967-500MG-F	500 mg

Z-β-Homoala-OH, ≥98.0% (HPLC)

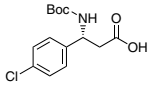
Z-L-β-Homoalanine; (*S*)-3-(Z-amino)butyric acid
[83509-88-0]
$C_{12}H_{15}NO_4$
FW 237.25



61669-500MG-F	500 mg

(*R*)-Boc-4-chloro-β-Phe-OH, ≥98.0% (HPLC)

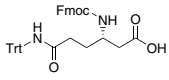
(*R*)-3-(Boc-amino)-3-(4-chlorophenyl)propionic acid; Boc-4-chloro-L-β-phenylalanine
[479064-93-2]
$C_{14}H_{18}ClNO_4$
FW 299.75



61902-500MG-F	500 mg

Fmoc-β-Homogln(Trt)-OH, ≥95.0% (HPLC)

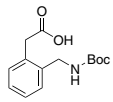
N_β-Fmoc-N_ϵ-trityl-L-homoglutamine; (*S*)-3-(Fmoc-amino)-*N*-trityl-adipic acid 6-amide
[401915-55-7]
$C_{40}H_{36}N_2O_5$
FW 624.72



64179-250MG-F	250 mg

2-(Boc-aminomethyl)phenylacetic acid, ≥99.0%

[40851-66-9]
$C_{14}H_{19}NO_4$
FW 265.30

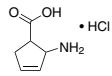


≥99.0% (HPLC)
99.0-101.0% (NaOH 0.1 M, T)

670758-100MG	100 mg
670758-500MG	500 mg

cis-2- Amino-3-cyclopentene-1-carboxylic acid hydrochloride, ≥97.0% (AT)

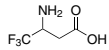
[122022-92-8]
$C_6H_9NO_2 \cdot HCl$
FW 163.60



68602-250MG	250 mg
68602-1G	1 g

3-Amino-4,4,4-trifluorobutyric acid, ≥98.0% (TLC)

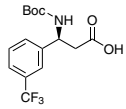
4,4,4-Trifluoro-β-homoalanine
[584-20-3]
$C_4H_6F_3NO_2$
FW 157.09



69289-500MG-F	500 mg

(*S*)-Boc-3-(trifluoromethyl)-β-Phe-OH, ≥98.0% (HPLC)

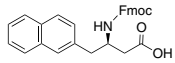
(*S*)-3-(Boc-amino)-3-[3-(trifluoromethyl)phenyl]propionic acid; Boc-3-(trifluoromethyl)-D-β-phenylalanine
[500770-78-5]
$C_{15}H_{18}F_3NO_4$
FW 333.30



69418-500MG-F	500 mg

(*R*)-3-(Fmoc-amino)-4-(2-naphthyl)butyric acid, ≥95.0% (HPLC)

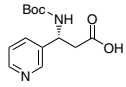
Fmoc-D-β-2-Homonal-OH; Fmoc-4-(2-naphthyl)-D-β-homoalanine
[269398-91-6]
$C_{29}H_{25}NO_4$
FW 451.51



70796-500MG-F	500 mg

(*R*)-Boc-3-(3-pyridyl)-β-Ala-OH, ≥96.0% (HPLC)

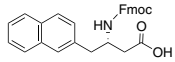
L-Boc-3-(3-pyridyl)-β-alanine; (*R*)-3-(Boc-amino)-3-(3-pyridyl)propionic acid
[500788-96-5]
$C_{13}H_{18}N_2O_4$
FW 266.29



72722-500MG-F	500 mg

(*S*)-3-(Fmoc-amino)-4-(2-naphthyl)butyric acid, ≥97.0% (HPLC)

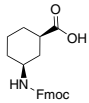
Fmoc-β-2-Homonal-OH; Fmoc-4-(2-naphthyl)-L-β-homoalanine
[270063-40-6]
$C_{29}H_{25}NO_4$
FW 451.51



72829-500MG-F	500 mg

cis-3-(Fmoc-amino)cyclohexanecarboxylic acid, ≥98.0% (HPLC)

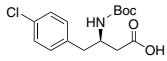
$C_{22}H_{23}NO_4$
FW 365.42



73024-500MG-F	500 mg

(*R*)-Boc-4-chloro-β-Homophe-OH, ≥98.0% (HPLC)

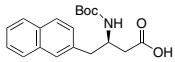
(*R*)-3-(Boc-amino)-4-(4-chlorophenyl)butyric acid;
Boc-4-chloro-D-β-homophenylalanine
[218608-96-9]
$C_{15}H_{20}ClNO_4$
FW 313.78



73086-500MG-F 500 mg

(*R*)-3-(Boc-amino)-4-(2-naphthyl)butyric acid, ≥98.0% (HPLC)

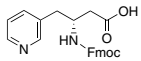
Boc-D-β-2-Homonal-OH;
Boc-4-(2-naphthyl)-D-β-homoalanine
[219297-10-6]
$C_{19}H_{23}NO_4$
FW 329.39



73300-500MG-F 500 mg

(*R*)-Fmoc-4-(3-pyridyl)-β-Homoala-OH, ≥98.0% (HPLC)

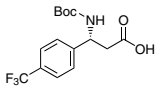
(*R*)-3-(Fmoc-amino)-4-(3-pyridyl)butyric acid;
Fmoc-4-(3-pyridyl)-D-β-homoalanine
[269396-66-9]
$C_{24}H_{22}N_2O_4$
FW 402.44



73309-500MG-F 500 mg

(*R*)-Boc-4-(trifluoromethyl)-β-Phe-OH, ≥98.0% (HPLC)

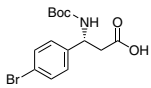
(*R*)-3-(Boc-amino)-3-[4-(trifluoromethyl)phenyl]propionic acid; Boc-4-(trifluoromethyl)-L-β-phenylalanine
[501015-19-6]
$C_{15}H_{18}F_3NO_4$
FW 333.30



73999-500MG-F 500 mg

(*R*)-Boc-4-bromo-β-Phe-OH, ≥98.0% (HPLC)

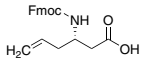
(*R*)-3-(Boc-amino)-3-(4-bromophenyl)propionic acid;
Boc-4-bromo-L-β-phenylalanine
[261380-20-5]
$C_{14}H_{18}BrNO_4$
FW 344.20



74037-500MG-F 500 mg

(*S*)-3-(Fmoc-amino)-5-hexenoic acid, ≥95.0% (HPLC)

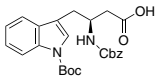
Fmoc-4-vinyl-L-β-homoalanine
[270263-04-2]
$C_{21}H_{21}NO_4$
FW 351.40



75561-500MG-F 500 mg

Z-β-Homotrp(Boc)-OH, ≥97.0% (HPLC)

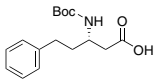
$N_β$-Z-N_{in}-Boc-L-β-homotryptophan;
N_{in}-Boc-$N_β$-Z-L-β-homotryptophan
$C_{25}H_{28}N_2O_6$
FW 452.50



76024-500MG-F 500 mg

(*S*)-3-(Boc-amino)-5-phenylpentanoic acid, ≥97.0% (C)

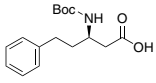
Boc-5-phenyl-L-β-norvaline
[218608-84-5]
$C_{16}H_{23}NO_4$
FW 293.36



76144-500MG-F 500 mg

(*R*)-3-(Boc-amino)-5-phenylpentanoic acid, ≥97.0% (GC)

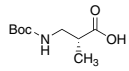
Boc-5-phenyl-D-β-norvaline
[218608-83-4]
$C_{16}H_{23}NO_4$
FW 293.36



78018-500MG-F 500 mg

(*R*)-3-(Boc-amino)-2-methylpropionic acid, ≥98.0% (TLC)

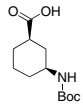
(*R*)-Boc-β²-Homoala-OH
[132696-45-8]
$C_9H_{17}NO_4$
FW 203.24



78953-500MG-F 500 mg

cis-3-(Boc-amino)cyclohexanecarboxylic acid, ≥98.0% (TLC)

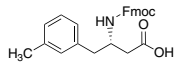
[222530-33-8]
$C_{12}H_{21}NO_4$
FW 243.30



80393-500MG-F 500 mg

(*S*)-Fmoc-3-methyl-β-Homophe-OH, ≥98.0% (HPLC)

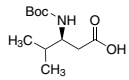
(*S*)-3-(Fmoc-amino)-4-(3-methylphenyl)butyric acid;
Fmoc-3-methyl-L-β-homophenylalanine
[270062-94-7]
$C_{26}H_{25}NO_4$
FW 415.48



80587-500MG-F 500 mg

Boc-D-β-Leu-OH, ≥98.0% (TLC)

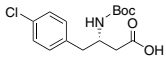
(*S*)-3-(Boc-amino)-4-methylpentanoic acid;
Boc-D-β-Homoval-OH; Boc-D-β-Leucine
[179412-79-4]
$C_{11}H_{21}NO_4$
FW 231.29



80674-250MG 250 mg

(*S*)-Boc-4-chloro-β-Homophe-OH, ≥98.0% (HPLC)

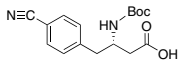
(*S*)-3-(Boc-amino)-4-(4-chlorophenyl)butyric acid;
Boc-4-chloro-L-β-homophenylalanine
[270596-42-4]
$C_{15}H_{20}ClNO_4$
FW 313.78



81771-500MG-F 500 mg

(*S*)-Boc-4-cyano-β-Homophe-OH, ≥98.0% (HPLC)

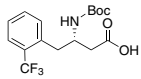
(*S*)-3-(Boc-amino)-4-(4-cyanophenyl)butyric acid;
Boc-4-cyano-L-β-homophenylalanine
[270065-89-9]
$C_{16}H_{20}N_2O_4$
FW 304.34



81834-500MG-F 500 mg

(*S*)-Boc-2-(trifluoromethyl)-β-Homophe-OH, ≥98.0% (HPLC)

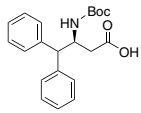
(*S*)-3-(Boc-amino)-4-[2-(trifluoromethyl)phenyl]butyric acid; Boc-2-(trifluoromethyl)-L-β-homophenylalanine
[270065-74-2]
$C_{16}H_{20}F_3NO_4$
FW 347.33



81998-500MG-F 500 mg

(*S*)-Boc-γ,γ-diphenyl-β-Homoala-OH, ≥98.0% (HPLC)

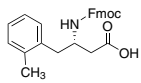
(*S*)-3-(Boc-amino)-4,4-diphenylbutyric acid;
Boc-γ,γ-diphenyl-D-β-homoalanine
[190190-50-2]
$C_{21}H_{25}NO_4$
FW 355.43



82007-500MG-F 500 mg

(*S*)-Fmoc-2-methyl-β-Homophe-OH, ≥98.0% (HPLC)

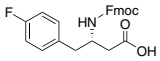
(*S*)-3-(Fmoc-amino)-4-(2-methylphenyl)butyric acid;
Fmoc-2-methyl-L-β-homophenylalanine
[270062-91-4]
$C_{26}H_{25}NO_4$
FW 415.48



85497-500MG-F 500 mg

(*R*)-Fmoc-4-fluoro-β-Homophe-OH, ≥98.0% (HPLC)

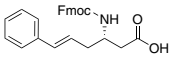
(*R*)-3-(Fmoc-amino)-4-(4-fluorophenyl)butyric acid; Fmoc-4-fluoro-D-β-homophenylalanine
[331763-70-3]
$C_{25}H_{22}FNO_4$
FW 419.44



87084-500MG-F 500 mg

(*S*)-3-(Fmoc-amino)-6-phenyl-5-hexenoic acid, ≥97.0% (HPLC)

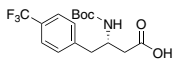
Fmoc-4-styryl-L-β-homoalanine
[270596-45-7]
$C_{27}H_{25}NO_4$
FW 427.49



87901-500MG-F 500 mg

(*S*)-Boc-2-(trifluoromethyl)-β-Homophe-OH, ≥98.0% (HPLC)

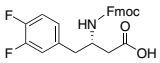
(*S*)-3-(Boc-amino)-4-[4-(trifluoromethyl)phenyl] butyric acid; Boc-4-(trifluoromethyl)-L-β-homo-phenylalanine
[270065-80-0]
$C_{16}H_{20}F_3NO_4$
FW 347.33



87943-500MG-F 500 mg

(*S*)-Fmoc-3,4-difluoro-β-Homophe-OH, ≥98.0% (HPLC)

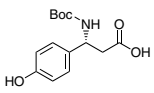
Fmoc-3,4-difluoro-L-β-homophenylalanine; (*S*)-3-(Fmoc-amino)-4-(3,4-difluorophenyl)butyric acid
[270063-55-3]
$C_{25}H_{21}F_2NO_4$
FW 437.44



88574-500MG-F 500 mg

(*R*)-Boc-β-Tyr-OH, ≥97.0% (HPLC)

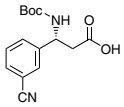
(*R*)-3-(Boc-amino)-3-(4-hydroxyphenyl)propionic acid; Boc-L-β-tyrosine
[329013-12-9]
$C_{14}H_{19}NO_5$
FW 281.30



89090-500MG-F 500 mg

(*R*)-Boc-3-cyano-β-Phe-OH, ≥98.0% (HPLC)

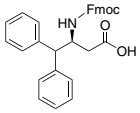
(*R*)-3-(Boc-amino)-3-(3-cyanophenyl)propionic acid; Boc-3-cyano-L-β-phenylalanine
[501015-21-0]
$C_{15}H_{18}N_2O_4$
FW 290.31



89178-500MG-F 500 mg

(*S*)-Fmoc-γ,γ-diphenyl-β-Homoala-OH, ≥98.0% (HPLC)

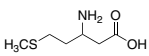
(*S*)-3-(Fmoc-amino)-4,4-diphenylbutyric acid; Fmoc-γ,γ-diphenyl-D-β-homoalanine
[332062-08-5]
$C_{31}H_{27}NO_4$
FW 477.55



89846-500MG-F 500 mg

DL-β-Homomethionine, ≥99.0% (TLC)

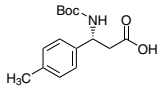
(±)-3-Amino-5-(methylthio)pentanoic acid
[158570-14-0]
$C_6H_{13}NO_2S$
FW 163.24



90205-1G-F 1 g

(*R*)-Boc-4-methyl-β-Phe-OH, ≥98.0% (HPLC)

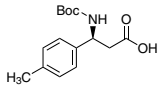
(*R*)-3-(Boc-amino)-3-(4-methylphenyl)propionic acid; Boc-4-methyl-L-β-phenylalanine
[479064-97-6]
$C_{15}H_{21}NO_4$
FW 279.33



90297-500MG-F 500 mg

(*S*)-Boc-4-methyl-β-Phe-OH, ≥98.0% (HPLC)

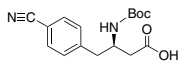
(*S*)-3-(Boc-amino)-3-(4-methylphenyl)propionic acid; Boc-4-methyl-D-β-phenylalanine
[479064-96-5]
$C_{15}H_{21}NO_4$
FW 279.33



90298-500MG-F 500 mg

(*R*)-Boc-4-cyano-β-Homophe-OH, ≥98.0% (HPLC)

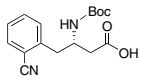
(*R*)-3-(Boc-amino)-4-(4-cyanophenyl)butyric acid; Boc-4-cyano-D-β-homophenylalanine
[269726-86-5]
$C_{16}H_{20}N_2O_4$
FW 304.34



90368-500MG-F 500 mg

(*S*)-Boc-2-cyano-β-Homophe-OH, ≥98.0% (HPLC)

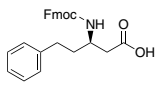
(*S*)-3-(Boc-amino)-4-(2-cyanophenyl)butyric acid; Boc-2-cyano-L-β-homophenylalanine
[270065-83-3]
$C_{16}H_{20}N_2O_4$
FW 304.34



91919-500MG-F 500 mg

(*R*)-3-(Fmoc-amino)-5-phenyl-pentanoic acid, ≥95.0% (HPLC)

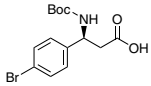
Fmoc-5-phenyl-D-β-norvaline
[269398-87-0]
$C_{26}H_{25}NO_4$
FW 415.48



92282-500MG-F 500 mg

(*S*)-Boc-4-bromo-β-Phe-OH, ≥98.0% (HPLC)

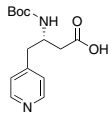
(*S*)-3-(Boc-amino)-3-(4-bromophenyl)propionic acid; Boc-4-bromo-D-β-phenylalanine
[261165-06-4]
$C_{14}H_{18}BrNO_4$
FW 344.20



93123-500MG-F 500 mg

(*S*)-Boc-4-(4-pyridyl)-β-Homoala-OH, ≥97.0% (HPLC)

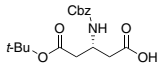
(*S*)-3-(Boc-amino)-4-(4-pyridyl)butyric acid; Boc-4-(4-pyridyl)-L-β-homoalanine
[219297-13-9]
$C_{14}H_{20}N_2O_4$
FW 280.32



93647-500MG-F 500 mg

Z-β-Glu(*Ot*Bu)-OH, ≥94% (HPLC)

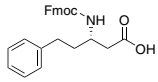
Z-L-β-Glutamic acid 5-*tert*-butyl ester; Z-D-β-Glutamic acid 5-*tert*-butyl ester; Z-L-β-Homoaspartic acid 5-*tert*-butyl ester
[118247-88-4]
$C_{17}H_{23}NO_6$
FW 337.37



94064-500MG-F 500 mg

(*S*)-3-(Fmoc-amino)-5-phenyl-pentanoic acid, ≥95.0% (HPLC)

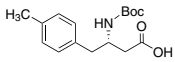
Fmoc-5-phenyl-L-β-norvaline
[219967-74-5]
$C_{26}H_{25}NO_4$
FW 415.48



94493-500MG-F	500 mg

(*S*)-Boc-4-methyl-β-Homophe-OH, ≥97.0% (HPLC)

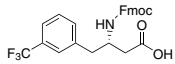
Boc-4-methyl-L-β-homophenylalanine;
(*S*)-3-(Boc-amino)-4-(4-methylphenyl)butyric acid
[270062-96-9]
$C_{16}H_{23}NO_4$
FW 293.36



94557-500MG-F	500 mg

(*S*)-Fmoc-3-(trifluoromethyl)-β-Homophe-OH, ≥97.0% (HPLC)

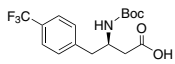
(*S*)-3-(Fmoc-amino)-4-[3-(trifluoromethyl)phenyl] butyric acid; Fmoc-3-(trifluoromethyl)-L-β-homo-phenylalanine
[270065-78-6]
$C_{26}H_{22}F_3NO_4$
FW 469.45



94591-500MG-F	500 mg

(*R*)-Boc-4-(trifluoromethyl)-β-Homophe-OH, ≥98.0% (HPLC)

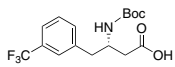
(*R*)-3-(Boc-amino)-4-[4-(trifluoromethyl)phenyl] butyric acid; Boc-4-(trifluoromethyl)-D-β-homophenylalanine
[269726-77-4]
$C_{16}H_{20}F_3NO_4$
FW 347.33



94592-500MG-F	500 mg

(*S*)-Boc-3-(trifluoromethyl)-β-Homophe-OH, ≥98.0% (HPLC)

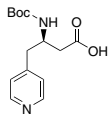
(*S*)-3-(Boc-amino)-4-[3-(trifluoromethyl)phenyl] butyric acid; Boc-3-(trifluoromethyl)-L-β-homophenylalanine
[270065-77-5]
$C_{16}H_{20}F_3NO_4$
FW 347.33



94603-500MG-F	500 mg

(*R*)-Boc-4-(4-pyridyl)-β-Homoala-OH, ≥98.0% (HPLC)

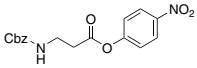
(*R*)-3-(Boc-amino)-4-(4-pyridyl)butyric acid;
Boc-4-(4-pyridyl)-D-β-homoalanine
[269396-68-1]
$C_{14}H_{20}N_2O_4$
FW 280.32



95336-500MG-F	500 mg

Z-β-Ala-ONp, ≥98.0% (HPLC)

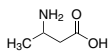
Z-β-alanine 4-nitrophenyl ester
[3642-91-9]
$C_{17}H_{16}N_2O_6$
FW 344.32



95875-1G	1 g

3-Aminobutanoic acid, 97%

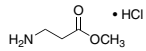
(±)-3-Aminobutyric acid; DL-3-Aminobutyric acid
[541-48-0]
$C_4H_9NO_2$
FW 103.12



A44207-5G	5 g
A44207-25G	25 g

β-Alanine methyl ester hydrochloride, ≥98.0% (AT)

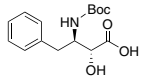
Methyl 3-aminopropionate hydrochloride
[3196-73-4]
$C_4H_9NO_2 \cdot HCl$
FW 139.58



05210-10G	10 g

(2*R*,3*R*)-3-(Boc-amino)-2-hydroxy-4-phenylbutyric acid, ≥98.0% (TLC)

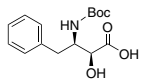
Boc-(2*R*,3*R*)-3-amino-2-hydroxy-4-phenylbutyric acid
[77171-41-6]
$C_{15}H_{21}NO_5$
FW 295.33



15058-25MG	25 mg

(2*S*,3*R*)-3-(Boc-amino)-2-hydroxy-4-phenylbutyric acid, ≥98.0% (TLC)

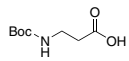
Boc-(2*S*,3*R*)-3-amino-2-hydroxy-4-phenylbutyric acid
[62023-65-8]
$C_{15}H_{21}NO_5$
FW 295.33



15059-25MG	25 mg
15059-100MG	100 mg

Boc-β-Ala-OH, ≥99.0% (TLC)

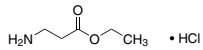
Boc-β-alanine
[3303-84-2]
$C_8H_{15}NO_4$
FW 189.21



15382-5G	5 g
15382-25G	25 g
15382-100G	100 g

β-Alanine ethyl ester hydrochloride, 98%

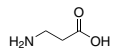
Ethyl 3-aminopropionate hydrochloride
[4244-84-2]
$C_5H_{11}NO_2 \cdot HCl$
FW 153.61



306142-10G	10 g
306142-50G	50 g

β-Alanine

β-Ala; 3-Aminopropionic acid
[107-95-9]
$C_3H_7NO_2$
FW 89.09



▶ **99%**

146064-25G	25 g
146064-500G	500 g
146064-2KG	2 kg

▶ **≥99.0% (NT)**

05160-50G	50 g
05160-250G	250 g
05160-1KG	1 kg

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Natural Amino Acid Building Blocks for Peptide Synthesis

With a growing peptide drug market the fast, reliable and uncomplicated synthesis of peptides is of paramount importance.[8] Today, the most common synthetic approaches to medium and even large peptides follow the Boc/Bzl or Fmoc/tBu solid phase peptide synthesis strategies.[9] A convenient list of the most popular Boc- and Fmoc-protected amino acid building blocks for these two synthesis strategies can be found in this issue. The Boc-protected amino acids are also frequently used in solution phase peptide synthesis procedures.

References: (8) Marx, V. *C&E News* **2005**, *83*, 17. (9) Houben-Weyl, Methods of Organic Chemistry, *"Synthesis of Peptides and Peptidomimetics"*, Thieme **2001**, *add. and suppl. vol. to the 4th ed. Vol E 22 a*.

BOC-protected Amino Acids

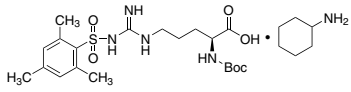
Boc-Ala-OH, ≥99.0% (TLC)

Boc-L-alanine; *N*-(*tert*-Butoxycarbonyl)-L-alanine
[15761-38-3]
$C_8H_{15}NO_4$
FW 189.21

15380-5G	5 g
15380-25G	25 g
15380-100G	100 g

Boc-Arg(Mts)-OH cyclohexylammonium salt, ≥99.0% (TLC)

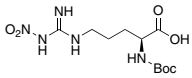
N_α-Boc-N_ω-(mesitylene-2-sulfonyl)-L-arginine cyclohexylammonium salt
[68262-72-6]
$C_{20}H_{32}N_4O_6S \cdot C_6H_{13}N$
FW 555.73



15545-2.5G	2.5 g

Boc-Arg(NO$_2$)-OH, ≥98.5% (T, calc. based on dry substance)

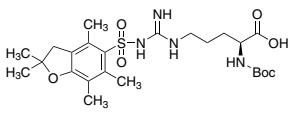
N_α-Boc-N_ω-nitro-L-arginine
[2188-18-3]
$C_{11}H_{21}N_5O_6$
FW 319.31



15470-5G	5 g
15470-25G	25 g

Boc-Arg(Pbf)-OH, ≥98.0% (TLC)

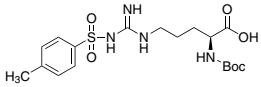
N_α-Boc-N_ω-(2,2,4,6,7-pentamethyl-dihydrobenzofuran-5-sulfonyl)-L-arginine; N_α-Boc-N_ω-Pbf-L-arginine
[200124-22-7]
$C_{24}H_{38}N_4O_7S$
FW 526.65



15038-5G	5 g

Boc-Arg(Tos)-OH

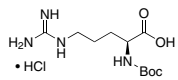
N_α-Boc-N_ω-tosyl-L-arginine
[13836-37-8]
$C_{18}H_{28}N_4O_6S$
FW 428.50



15506-5G	5 g

Boc-Arg-OH hydrochloride, ≥98.0% (TLC)

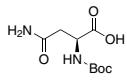
N_α-Boc-L-arginine hydrochloride
[35897-34-8]
$C_{11}H_{22}N_4O_4 \cdot HCl$
FW 310.78



15063-5G	5 g

Boc-Asn-OH, ≥98.5% (T)

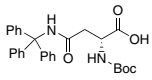
Boc-L-asparagine; N_α-(*tert*-Butoxycarbonyl)-L-asparagine
[7536-55-2]
$C_9H_{16}N_2O_5$
FW 232.23



15381-5G	5 g
15381-25G	25 g

Boc-Asn(Trt)-OH, ≥99.0% (TLC)

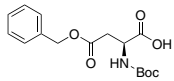
N_α-Boc-N_γ-trityl-L-asparagine
[132388-68-2]
$C_{28}H_{30}N_2O_5$
FW 474.55



15562-1G	1 g

Boc-Asp(OBzl)-OH, ≥99.0% (HPLC, sum of enantiomers)

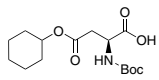
Boc-L-aspartic acid 4-benzyl ester;
N-(*tert*-Butoxycarbonyl)-L-aspartic acid 4-benzyl ester
[7536-58-5]
$C_{16}H_{21}NO_6$
FW 323.34



15386-5G	5 g
15386-25G	25 g

Boc-Asp(OcHx)-OH, ≥98.0% (T)

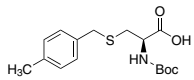
Boc-L-aspartic acid 4-cyclohexyl ester
[73821-95-1]
$C_{15}H_{25}NO_6$
FW 315.36



15398-5G	5 g

Boc-Cys(Mbzl)-OH, ≥96.0% (HPLC)

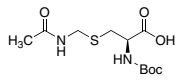
Boc-*S*-(4-methylbenzyl)-L-cysteine
[61925-77-7]
$C_{16}H_{23}NO_4S$
FW 325.42



15444-5G	5 g

Boc-Cys(Acm)-OH, ≥96.0% (T)

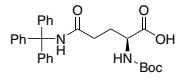
Boc-*S*-acetamidomethyl-L-cysteine
[19746-37-3]
$C_{11}H_{20}N_2O_5S$
FW 292.35



15376-5G	5 g

Boc-Gln(Trt)-OH, ≥98.0% (TLC)

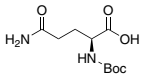
N_α-Boc-N_δ-trityl-L-glutamine
[132388-69-3]
$C_{29}H_{32}N_2O_5$
FW 488.57



15563-5G	5 g

Boc-Gln-OH, 98%

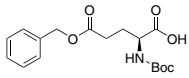
Boc-L-glutamine; N_α-(*tert*-Butoxycarbonyl)-L-glutamine
[13726-85-7]
$C_{10}H_{18}N_2O_5$
FW 246.26



408441-5G	5 g
408441-25G	25 g

Boc-Glu(OBzl)-OH, ≥98.0% (T)

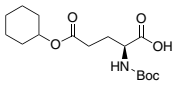
Boc-L-glutamic acid 5-benzyl ester
[13574-13-5]
$C_{17}H_{23}NO_6$
FW 337.37



15418-5G	5 g
15418-25G	25 g

Boc-Glu(OcHx)-OH, ≥98.0% (TLC, sum of enantiomers)

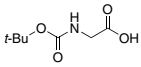
Boc-L-glutamic acid γ-cyclohexyl ester;
Boc-L-glutamic acid 5-cyclohexyl ester
[73821-97-3]
$C_{16}H_{27}NO_6$
FW 329.39



15437-5G	5 g

Boc-Gly-OH, ≥99.0% (T)

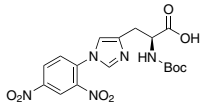
Boc-glycine; *N*-(*tert*-Butoxycarbonyl)glycine
[4530-20-5]
$C_7H_{13}NO_4$
FW 175.18



15420-5G	5 g
15420-25G	25 g
15420-100G	100 g

Boc-His(Dnp)-OH, ≥98.0% (TLC)

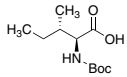
N_α-Boc-$N_{(im)}$-2,4-dinitrophenyl-L-histidine
[25024-53-7]
$C_{17}H_{19}N_5O_8 \cdot C_3H_8O$
FW 481.46



15287-5G	5 g

Boc-Ile-OH, 98%

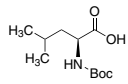
Boc-L-isoleucine; *N*-(*tert*-Butoxycarbonyl)-L-isoleucine
[13139-16-7]
$C_{11}H_{21}NO_4$
FW 231.29



359653-25G	25 g

Boc-Leu-OH, ≥99.0% (HPLC)

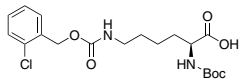
Boc-L-leucine
[13139-15-6]
$C_{11}H_{21}NO_4$
FW 231.29



15450-5G-F	5 g
15450-25G-F	25 g
15450-100G-F	100 g

Boc-Lys(2-Cl-Z)-OH, ≥98.0% (T)

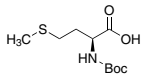
N_α-Boc-N_ϵ-(2-chloro-Z)-L-lysine
[54613-99-9]
$C_{19}H_{27}ClN_2O_6$
FW 414.88



15399-5G	5 g

Boc-Met-OH, 99%

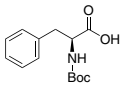
N-(*tert*-Butoxycarbonyl)-L-methionine; Boc-L-methionine
[2488-15-5]
$C_{10}H_{19}NO_4S$
FW 249.33



408425-5G	5 g
408425-25G	25 g

Boc-Phe-OH, ≥99.0% (T)

Boc-L-phenylalanine; *N*-(*tert*-Butoxycarbonyl)-L-phenylalanine
[13734-34-4]
$C_{14}H_{19}NO_4$
FW 265.30



15480-5G	5 g
15480-25G	25 g
15480-100G	100 g

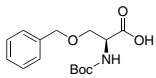
Boc-Pro-OH, ≥99.0% (T)

Boc-L-proline; *N*-(*tert*-Butoxycarbonyl)-L-proline
[15761-39-4]
$C_{10}H_{17}NO_4$
FW 215.25

15490-5G	5 g
15490-25G	25 g
15490-100G	100 g

Boc-Ser(Bzl)-OH, ≥99.0% (T)

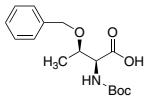
Boc-*O*-benzyl-L-serine; *N*-(*tert*-Butoxycarbonyl)-*O*-benzyl-L-serine
[23680-31-1]
$C_{15}H_{21}NO_5$
FW 295.33



15390-5G	5 g
15390-25G	25 g

Boc-Thr(Bzl)-OH, ≥99.0% (T)

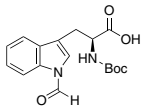
Boc-*O*-benzyl-L-threonine; *N*-(*tert*-Butoxycarbonyl)-*O*-benzyl-L-threonine
[15260-10-3]
$C_{16}H_{23}NO_5$
FW 309.36



15405-5G	5 g

Boc-Trp(For)-OH, ≥97.0% (HPLC)

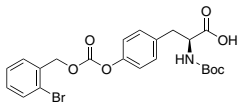
N_α-Boc-$N_{(in)}$-formyl-L-tryptophan
[47355-10-2]
$C_{17}H_{20}N_2O_5$
FW 332.35



15349-5G-F	5 g

Boc-Tyr(2-Br-Z)-OH, ≥99.0% (TLC, sum of enantiomers)

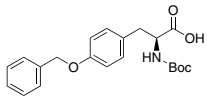
Boc-*O*-(2-bromo-Z)-L-tyrosine
[47689-67-8]
$C_{22}H_{24}BrNO_7$
FW 494.33



15431-5G	5 g
15431-25G	25 g

Boc-Tyr(Bzl)-OH, ≥99.0% (T)

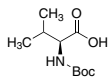
Boc-*O*-benzyl-L-tyrosine
[2130-96-3]
$C_{21}H_{25}NO_5$
FW 371.43



15410-5G	5 g
15410-25G	25 g

Boc-Val-OH, ≥99.0% (T)

(*S*)-2-(Boc-amino)-3-methylbutyric acid;
Boc-L-valine; *N*-(*tert*-Butoxycarbonyl)-L-valine
[13734-41-3]
$C_{10}H_{19}NO_4$
FW 217.26



15528-25G	25 g
15528-100G	100 g

FMOC-protected Amino Acids

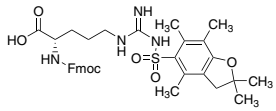
Fmoc-Ala-OH, 95%

Fmoc-L-alanine; *N*-(9-Fluorenylmethoxycarbonyl)-L-alanine
[35661-39-3]
$C_{18}H_{17}NO_4$
FW 311.33

531480-5G	5 g
531480-25G	25 g

Fmoc-Arg(Pbf)-OH, ≥98.0% (HPLC)

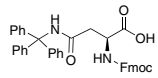
N_α-Fmoc-N_ω-(2,2,4,6,7-pentamethyldihydrobenzofuran-5-sulfonyl)-L-arginine; N_α-Fmoc-N_ω-Pbf-L-arginine
[154445-77-9]
$C_{34}H_{40}N_4O_7S$
FW 648.77



47349-1G	1 g
47349-5G	5 g
47349-25G	25 g

Fmoc-Asn(Trt)-OH, ≥97.0% (HPLC, sum of enantiomers)

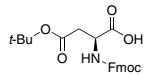
N_α-Fmoc-N_γ-trityl-L-asparagine;
N_α-(9-Fluorenylmethoxycarbonyl)-N_γ-trityl-L-asparagine
[132388-59-1]
$C_{38}H_{32}N_2O_5$
FW 596.67



47672-1G-F	1 g
47672-5G-F	5 g
47672-25G-F	25 g

Fmoc-Asp(OtBu)-OH, ≥98.0% (HPLC)

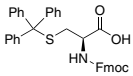
Fmoc-L-aspartic acid 4-*tert*-butyl ester
[71989-14-5]
$C_{23}H_{25}NO_6$
FW 411.45



47618-1G-F	1 g
47618-10G-F	10 g
47618-25G-F	25 g

Fmoc-Cys(Trt)-OH, ≥95.0% (HPLC, sum of enantiomers)

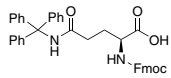
N_α-Fmoc-*S*-trityl-L-cysteine;
N-(9-Fluorenylmethoxycarbonyl)-*S*-trityl-L-cysteine
[103213-32-7]
$C_{37}H_{31}NO_4S$
FW 585.71



47695-5G	5 g

Fmoc-Gln(Trt)-OH, ≥98.0% (HPLC)

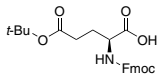
N_α-Fmoc-N_δ-trityl-L-glutamine
[132327-80-1]
$C_{39}H_{34}N_2O_5$
FW 610.70



47674-1G-F	1 g
47674-5G-F	5 g
47674-25G-F	25 g

Fmoc-Glu(OtBu)-OH, ≥98.0% (HPLC)

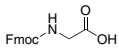
Fmoc-L-glutamic acid 5-*tert*-butyl ester
[71989-18-9]
$C_{24}H_{27}NO_6$
FW 425.47



47625-1G	1 g
47625-10G	10 g
47625-25G	25 g

Fmoc-Gly-OH, ≥98.0% (T)

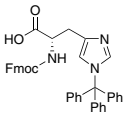
Fmoc-glycine
[29022-11-5]
$C_{17}H_{15}NO_4$
FW 297.31



47627-5G-F	5 g
47627-50G-F	50 g

Fmoc-His(Trt)-OH, ≥98.0% (HPLC, sum of enantiomers)

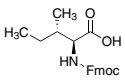
N_α-Fmoc-$N_{(im)}$-trityl-L-histidine
[109425-51-6]
$C_{40}H_{33}N_3O_4$
FW 619.71



47639-5G-F	5 g
47639-25G-F	25 g

Fmoc-Ile-OH, ≥98.0% (T)

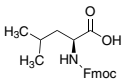
Fmoc-L-isoleucine; *N*-(9-Fluorenylmethoxycarbonyl)-L-isoleucine
[71989-23-6]
$C_{21}H_{23}NO_4$
FW 353.41



47628-5G-F	5 g
47628-50G-F	50 g

Fmoc-Leu-OH, ≥97.0% (HPLC)

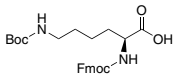
Fmoc-L-leucine; *N*-(9-Fluorenylmethoxycarbonyl)-L-leucine
[35661-60-0]
$C_{21}H_{23}NO_4$
FW 353.41



47633-5G-F	5 g
47633-50G-F	50 g

Fmoc-Lys(Boc)-OH, ≥98.0% (HPLC)

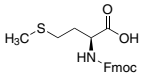
N_α-Fmoc-N_ϵ-Boc-L-lysine
[71989-26-9]
$C_{26}H_{32}N_2O_6$
FW 468.54



47624-1G-F	1 g
47624-10G-F	10 g
47624-25G-F	25 g

Fmoc-Met-OH, ≥98.0% (HPLC)

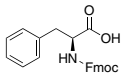
Fmoc-L-methionine
[71989-28-1]
$C_{20}H_{21}NO_4S$
FW 371.45



47634-5G-F	5 g

Fmoc-Phe-OH, 98%

Fmoc-L-phenylalanine; *N*-(9-Fluorenylmethoxycarbonyl)-L-phenylalanine
[35661-40-6]
$C_{24}H_{21}NO_4$
FW 387.43



338338-5G	5 g
338338-25G	25 g

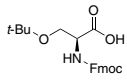
Fmoc-Pro-OH, ≥99.0% (HPLC)

Fmoc-L-proline; *N*-(9-Fluorenylmethoxycarbonyl)-L-proline
[71989-31-6]
$C_{20}H_{19}NO_4$
FW 337.37

47636-5G-F	5 g
47636-50G-F	50 g

Fmoc-Ser(tBu)-OH, ≥98.0% (HPLC)

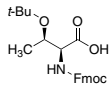
Fmoc-*O*-*tert*-butyl-L-serine
[71989-33-8]
$C_{22}H_{25}NO_5$
FW 383.44



47619-1G-F	1 g
47619-10G-F	10 g
47619-25G-F	25 g

Fmoc-Thr(tBu)-OH, ≥98.0% (HPLC)

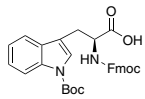
Fmoc-*O*-*tert*-butyl-L-threonine
[71989-35-0]
$C_{23}H_{27}NO_5$
FW 397.46



47622-1G-F	1 g
47622-10G-F	10 g

Fmoc-Trp(Boc)-OH, ≥97.0% (HPLC)

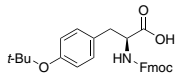
N_α-Fmoc-$N_{(in)}$-Boc-L-tryptophan;
$N_{(in)}$-Boc-N_α-Fmoc-L-tryptophan
[143824-78-6]
$C_{31}H_{30}N_2O_6$
FW 526.58



47561-1G-F	1 g
47561-5G-F	5 g
47561-25G-F	25 g

Fmoc-Tyr(*t*Bu)-OH, ≥98.0% (HPLC)

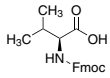
Fmoc-*O*-*tert*-butyl-L-tyrosine; *N*-(9-Fluorenylmethoxycarbonyl)-*O*-*tert*-butyl-L-tyrosine
[71989-38-3]
$C_{28}H_{29}NO_5$
FW 459.53



47623-1G-F	1 g
47623-10G-F	10 g
47623-25G-F	25 g

Fmoc-Val-OH, ≥98.0% (HPLC)

Fmoc-L-valine; *N*-(9-Fluorenylmethoxycarbonyl)-L-valine
[68858-20-8]
$C_{20}H_{21}NO_4$
FW 339.39



47638-50G-F	50 g

New Tools for PEGylation

PEG polymers offer numerous favorable characteristics including high water solubility, high mobility in solution, lack of toxicity and immunogenicity, and ready clearance from the body. Thus, the chemical modification of biologically active compounds, such as peptides, antibody fragments, enzymes, or small molecules with polyethylene glycol chains (referred to as "PEGylation"), is an effective method to tailor molecular properties to particular applications (**Figure 1**).

Drugs can especially benefit from PEGylation as has been proved by a continuously growing number of PEG conjugated drugs on the market. By increasing the molecular mass of proteins and peptides and shielding them from proteolytic enzymes, PEGylation improves pharmacokinetics.[10] The judicious choice of PEG size and linkers enhance a potential drug's solubility and its distribution within an organism.[11]

Numerous review articles concerning the application of PEG polymers in drug delivery are available.[12] In some recent reports PEGylation is discussed as a tool to facilitate the drug delivery of nanocarrier systems and microparticles.[13,14]

In this issue of ChemFiles, Sigma-Aldrich® is proud to further expand its offer of tools for PEGylation with new bifunctional, small and medium-sized ethylene glycol building blocks. For a complete list of PEGylation products, please visit our online product catalog at *sigma-aldrich.com/chemprod* and browse through the peptide synthesis category.

References: (10) Harris, J.M.; Chess, R.B. *Nature Rev. Drug. Disc.* **2003**, *2*, 214. (11) Fee, C. *Biotechn. and Bioeng.* **2007**, *98*, 725. (12)(a) "Peptide and Protein PEGylation, a Review of Problems and Solutions", Veronese, F.M. *Biomaterials* **2001**, *5*, 405. (b) "Chemistry for Peptide and Protein PEGylation", Roberts, M.J.; Bentley, M.D.; Jarris, J.M. *Adv. Drug Del. Rev.* **2002**, *4*, 459. (c) "PEGylation, Successful Approach to Drug Delivery", Veronese, F.M.; Pasut, G. *Drug Disc. Today* **2005**, *10*, 1451. (d) "Advances in PEGylation of Important Biotech Molecules: Delivery Aspects", Ryan, S.M.; Mantovani, G.; Wang, X.; Haddleton, D.M.; Brayden, D.J. *Exp. Op. on Drug Del.* **2008**, *5*, 371. (13) Howard, M.D.; Jay, M.; Dziubla, T.D.; Lu, X. *Biomed. Nanotechn.* **2008**, *4*, 133. (14) Wattendorf, U.; Merkle, H.P. *J. Pharm. Sci.* **2008**, *97*, 4655.

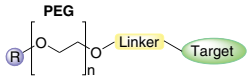
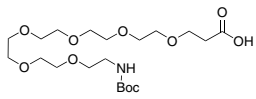


Figure 1

New PEG derivatives

21-(Boc-amino)-4,7,10,13,16,19-hexaoxaheneicosanoic acid, ≥97.0% (H-NMR)

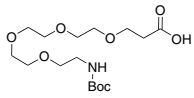
$C_{20}H_{39}NO_{10}$
FW 453.52



38263-100MG	100 mg
38263-500MG	500 mg

15-(Boc-amino)-4,7,10,13-tetraoxapentadecanoic acid, ≥97.0% (H-NMR)

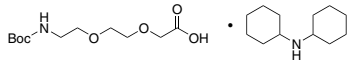
$C_{16}H_{31}NO_8$
FW 365.42



30953-100MG	100 mg
30953-500MG	500 mg

2-[2-(Boc-amino)ethoxy]ethoxyacetic acid (dicyclohexylammonium) salt, ≥98.0% (TLC)

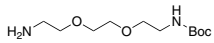
Boc-8-amino-3,6-dioxaoctanoic acid (dicyclohexylammonium) salt
$C_{11}H_{21}NO_6 \cdot C_{12}H_{23}N$
FW 444.61



14766-500MG-F	500 mg

N-Boc- 2,2′-(ethylenedioxy)diethylamine, ≥95.0% (NT)

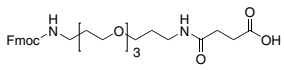
N-Boc-3,6-dioxa-1,8-octanediamine; *tert*-Butyl 2-[2-(2-aminoethoxy)ethoxy]ethylcarbamate
[153086-78-3]
$C_{11}H_{24}N_2O_4$
FW 248.32



89761-1G-F	1 g
89761-5G-F	5 g

N-Fmoc-*N*''-succinyl-4,7,10-trioxa-1,13-tridecanediamine, 95% (HPLC)

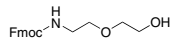
17-Oxo-6,9,12-trioxa-2,16-diazaeicosanedioic acid 1-(9H-fluoren-9-ylmethyl)ester
[172089-14-4]
$C_{29}H_{38}N_2O_8$
FW 542.62



671517-1G	1 g
671517-5G	5 g

2-[2-(Fmoc-amino)ethoxy]ethanol, 99%

[2-(2-Hydroxy-ethoxy)ethyl]carbamic acid 9*H*-fluoren-9-ylmethyl ester
[299430-87-8]
$C_{19}H_{21}NO_4$
FW 327.37
≥98.5% (HPLC)

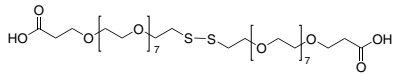


670529-500MG	500 mg

4,7,10,13,16,19,22,25,32,35,38,41,44,47,50,53-Hexadecaoxa-28,29-dithiahexapentacontanedioic acid

NEW

PEG acid disulfide (n=7)
[873013-93-5]
$C_{38}H_{74}O_{20}S_2$
FW 915.11

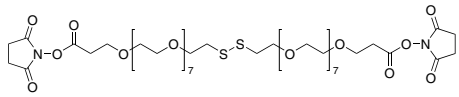


671525-100MG	100 mg
671525-500MG	500 mg

4,7,10,13,16,19,22,25,32,35,38,41,44,47,50,53-Hexadecaoxa-28,29-dithiahexapentacontanedioic acid di-*N*-succinimidyl ester

NEW

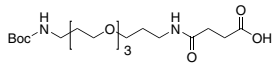
PEG NHS ester disulfide (n=7)
[947601-98-1]
$C_{46}H_{80}N_2O_{24}S_2$
FW 1109.26



671630-100MG	100 mg
671630-500MG	500 mg

N-Boc-*N*′-succinyl-4,7,10-trioxa-1,13-tridecanediamine, 95% (HPLC)

17-Oxo-6,9,12-trioxa-2,16-diazaeicosanedioic acid 1-(1,1-dimethylethyl)ester
[250612-31-8]
$C_{19}H_{36}N_2O_8$
FW 420.50



671401-1G	1 g
671401-5G	5 g

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