2011 CATALOG SUPPLEMENT

Biologically Active Peptides

Enzyme Inhibitors & Substrates

Custom Services Portfolio

Specialty Products & Technologies

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PEPTIDES INTERNATIONAL

Specialty Tools and Technologies

clear-ox™

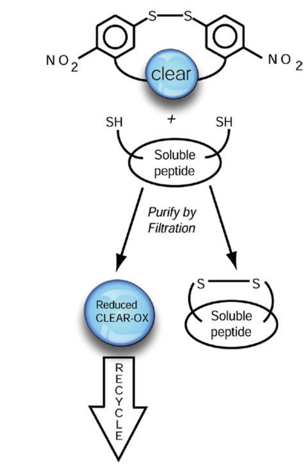
The chemistry used to oxidize the free thiol (-SH) bonds to the corresponding disulfide (-S-S-) bond in a controlled fashion remains a significant challenge in spite of many advances in peptide chemistry. Peptides International proudly introduces **CLEAR-OX™**, a new polymer-supported oxidant, which combines the power of solid phase chemistry with the versatility of solution-phase reactions.

CLEAR-OX™ is a highly effective polymer-supported reagent for the formation of disulfide-bonds.[1,2] CLEAR resin is the polymer of choice due to its compatibility with both aqueous and organic environments. A lysine-preformed cyclic Ellman's reagent [5,5'-dithiobis(2-nitrobenzoic acid) = DTNB] is covalently attached to a CLEAR polymeric support with a β-alanine spacer to yield CLEAR-OX.[3,4] Since the mechanism is based on peptide capture, sensitive residues such as Tyr, Trp, and Met are not affected, leading to increased purity and yield. These improved synthetic conditions allow for facile removal of the oxidant.

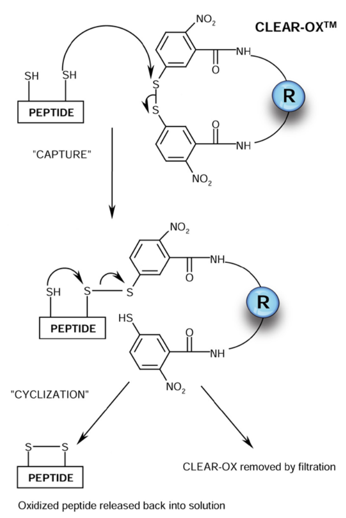
Single disulfide-bridged peptides with constrained amino acids have been successfully produced using CLEAR-OX with various ring sizes and lengths. Oxidations are performed at considerably higher concentrations than solution methods, thus leading to reduced solvent use for larger scale. Furthermore, oxidations are scalable with potential for recycling and automation using CLEAR-OX. Oxidations can be carried out immediately after cleavage with as low as two-fold excess of CLEAR-OX to obtain satisfactory yields. Most oxidations were complete within 1-2 hrs at an optimum pH < 7. Solubility problems of reduced peptides were overcome by the addition of organic solvents, such as acetonitrile, to the CLEAR-OX cyclization mixtures. While multiple bond formation is still under investigation, early reports indicate positive results.[5] In CLEAR-OX mediated oxidations, product yields and purities were better than or comparable to existing oxidation methods. However, CLEAR-OX is a superior choice when sensitive residues are present and because the method is so easy to use.

1. CLEAR resins are protected under US Patents 5,910,554 and 5,656,707.
2. K. Darlak, D.W. Long, A. Czerwinski, M. Darlak, F. Valenzuela, A.F. Spatola, and G. Barany, *J. Peptide Res.*, **63**, 303-312 (2004).
3. I. Annis, L. Chen, and G. Barany, *J. Am. Chem. Soc.*, **120**, 7226-7238 (1998).
4. CLEAR-OX™ US Patent Application 11/165,609 (June 23, 2005).
5. B.R. Green and G. Bulaj, *Protein Peptide Lett.*, **13**, 67-70 (2006)

K. Darlak, D.W. Long, A. Czerwinski, M. Darlak, F. Valenzuela, A.F. Spatola,



CLEAR-OX MEDIATED OXIDATIONS



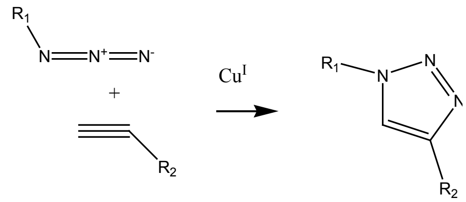
PRODUCT	CODE	QTY
CLEAR-OX™ *Polymer-Supported Oxidant for Disulfide Bond Formation* *CLEAR Polymer-Supported Oxidant for the Facile Formation of Disulfide-Bridged Peptides*	RCO-1260-PI -20 °C	1 g 5 g

For additional information and references please visit: http://www.pepnet.com/products/CLEAR-OX.pdf.

PRODUCT	CODE	QTY

Click Chemistry

Click chemistry is the popular term that describes a class of efficient and selective reactions that could be used to join molecules together rapidly and in high yield. The Huisgen 1,3-dipolar cycloaddition,[1] in particular the Cu(I)-catalyzed variant, is applied by Meldal[2] for the solid phase synthesis of peptidotriazoles, and by Sharpless[3] for the creation of covalent links between diverse building blocks. Click chemistry has been used in peptide cyclization, DNA-peptide conjugation, fluorescent dye labeling and surface immobilization of molecules. It has also been used in probing enzyme activities in cell lysates[4] or visualizing biomolecules in fixed cells.[5,6] Recently, Bertozzi[7] reported a unique copper-free version of click chemistry to create biomolecular probes for in vivo studies of live mice.



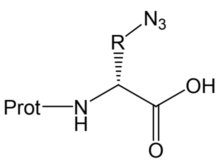
1. Huisgen, *1,3-Dipolar Cycloaddition Chemistry*, Vol. 1, 1984, p. 1.
2. Tornoe, *et al., J Org Chem,* **67**:3057–3064 (2002).
3. Rostovtsev, *et al., Angew Chem Int Ed*, **41**:2596–2599 (2002).
4. Speers, *et al., J Am Chem Soc,* **125**:4686–4687 (2003).
5. Beatty, *et al., Angew Chem Int Ed*, **45**:7364–7367 (2006).
6. Hsu, *et al., Proc Natl Acad Sci USA,* **104**:2614–2619 (2007).
7. Baskin, *et al., Proc Natl Acad Sci USA*, **104**:16793–16797 (2007).

Building Blocks for Click Chemistry

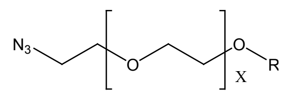
Peptide International offers a broad selection of reagents for click chemistry including azido building blocks, azido amino acids, azido-PEGs, and propargyl derivatives. Applications of these reagents include novel drug design, ligations to modulate bimolecular function, targeted delivery, nanotechnology, radiotracer attachments, and others.

Please contact us for bulk quantities or custom designed reagents for click chemistry applications. We also offer cost effective custom chemistry services utilizing these innovative reagents.

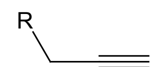
Protected Azido Acids



Azido PEG Reagents



Proargyl Derivatives



Azido-mini-PEG™ CHA salt — AXX-1905-PI — 1 g

8-Azido-3,6-Dioxaoctanoic Acid CHA Salt — 4 °C

(M.W. 189.17 • 99.18) $C_6H_{11}N_3O_4 \cdot C_6H_{13}N$

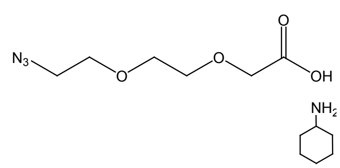
Building Block for Click Chemistry

5-Azido-Pentanoic Acid — APA-1906-PI — 1 g

δ-Azidovaleric Acid — 4 °C

(M.W. 143.15) $C_5H_9N_3O_2$ [79583-98-5]

Building Block for Click Chemistry



6-Azido-Hexanoic Acid — AHA-1904-PI — 1 g

ε-Azidocaproic Acid — 4 °C

(M.W. 157.17) $C_6H_{11}N_3O_2$ [79598-53-1]

Building Block for Click Chemistry

P. Wu, *et al., Angew. Chem. Intl Ed. Engl.*, **43**, 3928 (2004).
C. Grandjean, *et al., J. Org. Chem.*, **70**, 7123 (2005).
A. Watzke, *et al., Bioorg. Med. Chem.*, **14**, 6288 (2006).

PRODUCT	CODE	QTY

Cell Penetrating Peptides for Click Chemistry

Clickable-TAT Alkyne (49-57)

(Trifluoroacetate Salt)
5-hexynoyl-Arg-Lys-Lys-Arg-Arg-Gln-Arg-Arg-Arg-NH_2
(M.W. 1432.76) $C_{59}H_{113}N_{31}O_{11}$
Modified HIV TAT sequence 49-57

S. Brown and D. Graham, *Tet Lett,* **51**, 5032 (2010).

Code: TAT-3733-PI (-20 °C) — QTY: 1 mg, 5 mg

Clickable-TAT Azide (49-57)

(Trifluoroacetate Salt)
5-azido-pentanoyl-Arg-Lys-Lys-Arg-Arg-Gln-Arg-Arg-Arg-NH_2
(M.W. 1511.77) $C_{58}H_{114}N_{34}O_{14}$
Modified HIV TAT sequence 49-57

S. Brown and D. Graham, *Tet Lett,* **51**, 5032 (2010).

Code: TAT-3734-PI (-20 °C) — QTY: 1 mg, 5 mg

Cys-TAT (49-57)

(Trifluoroacetate Salt)
Cys-Arg-Lys-Lys-Arg-Arg-Gln-Arg-Arg-Arg-NH_2
(M.W. 1441.79) $C_{56}H_{112}N_{32}O_{11}S$
Cys- Modified HIV TAT sequence 49-57

L Santos-Cuevas, *et al.*, *Nucl Med Commun.*, **32**, 303 (2011).
P.A. Wender, *et al.*, *PNAS*, **97**, 13003 (2000).
J. Park, *et al.*, *J. Gen. Virol.*, **83**, 1173 (2002).

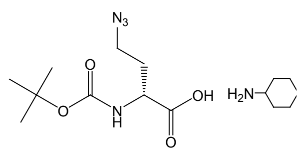
Code: TAT-3735-PI (-20 °C) — QTY: 1 mg, 5 mg

Unusual Amino Acids

Boc-Azido Amino Acids

Boc-D-Dab(N_3)-OH • CHA

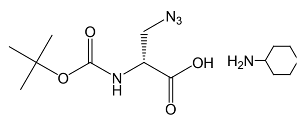
Boc-(R)-2-Amino-4-Azidobutanoic Acid CHA Salt
(M.W. 343.4)



Code: BDX-53115-PI (4 °C) — QTY: 1 g, 5 g, 25 g

Boc-D-Dap(N_3)-OH • CHA

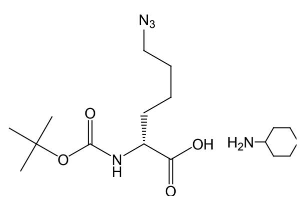
Boc-(R)-2-Amino-3-Azidopropanoic Acid CHA Salt
(M.W. 329.4)



Code: BDX-53114-PI (4 °C) — QTY: 1 g, 5 g, 25 g

Boc-D-Lys(N_3)-OH • CHA

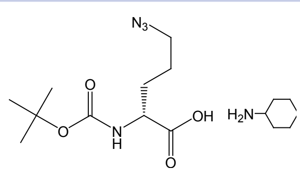
Boc-(R)-2-Amino-6-Azidohexanoic Acid CHA Salt
(M.W. 371.5)



Code: BDK-53117-PI (4 °C) — QTY: 1 g, 5 g, 25 g

Boc-D-Orn(N_3)-OH • CHA

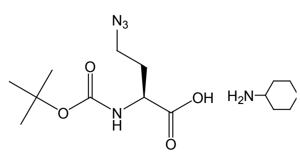
Boc-(R)-2-Amino-5-Azidopentanoic Acid CHA Salt
(M.W. 357.4)



Code: BDO-53116-PI (4 °C) — QTY: 1 g, 5 g, 25 g

Boc-Dab(N_3)-OH • CHA

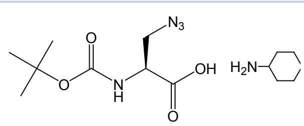
Boc-(S)-2-Amino-4-Azidobutanoic Acid CHA Salt
(M.W. 343.4)
[120042-08-2]



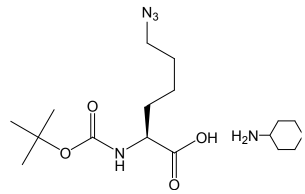
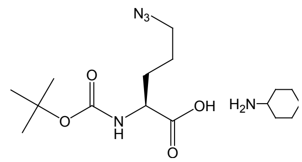
Code: BLX-53111-PI (4 °C) — QTY: 1 g, 5 g, 25 g

Boc-Dap(N_3)-OH • CHA

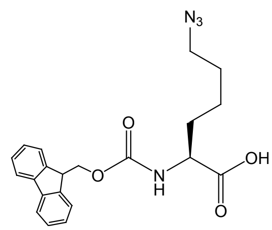
Boc-(S)-2-Amino-3-Azidopropanoic Acid CHA Salt
(M.W. 329.4)



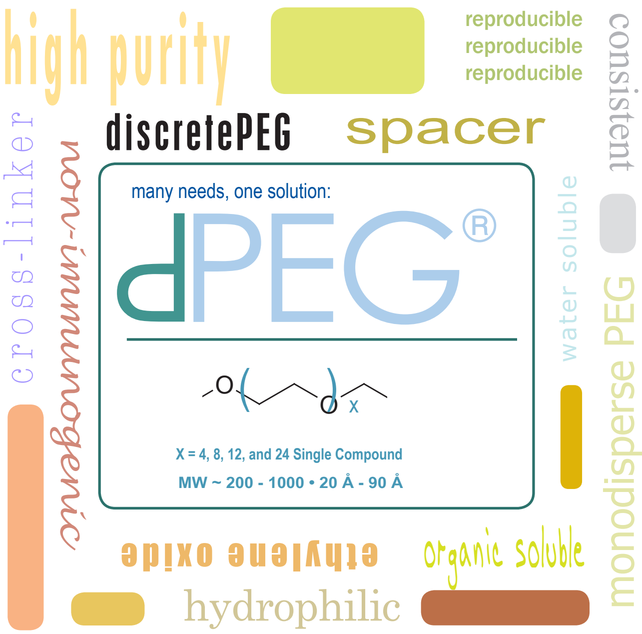
Code: BLX-53110-PI (4 °C) — QTY: 1 g, 5 g, 25 g

PRODUCT	CODE	QTY
Boc-Lys(N_3)-OH • CHA Boc-(S)-2-Amino-6-Azidohexanoic Acid CHA Salt (M.W. 371.5) [846549-33-5] 	BLK-53113-PI 4 °C	1 g 5 g 25 g
Boc-Orn(N_3)-OH • CHA Boc-(S)-2-Amino-5-Azidopentanoic Acid CHA Salt (M.W. 357.4) 	BLO-53112-PI 4 °C	1 g 5 g 25 g

Fmoc- Amino Acids

PRODUCT	CODE	QTY
Fmoc-ADP-OH N^{α}-9-Fluorenylmethoxycarbonyl-3-Amino-2,2-Dimethyl-Propionic Acid (M.W. 339.39) $C_{20}H_{21}NO_4$	FAP-1907-PI 4 °C	1 g
Fmoc-Arg(Z)$_2$-OH N^{α}-9-Fluorenylmethoxycarbonyl-N^{ω}-Bis-Carbobenzoxy-L-Arginine (M.W. 664.72) $C_{37}H_{36}N_4O_8$ [207857-35-0]	FRC-1902-PI 4 °C	1 g
Fmoc-Asp(Edans)-OH (M.W. 603.66) $C_{31}H_{29}N_3O_8S$ [182253-73-2]	FDE-1900-PI 4 °C	1 g
Fmoc-Azido-Lys-OH **Fmoc-Lys(N_3)-OH** N^{α}-9-Fluorenylmethoxycarbonyl-ε-Azido-L-Lysine (M.W. 394.43) $C_{21}H_{22}N_4O_4$ [159610-89-6] *Building Block for Click Chemistry* A. Le Chevalier Isaad, *et al.*, *J. Pept. Sci.*, **15**, 451 (2009). P.E. Schneggenburger, *et al.*, *J. Pept. Sci.*, **16**, 10 (2010). 	FAK-1903-PI 4 °C	1 g
Fmoc-Cpg-OH Fmoc-Cyclopentyl-Gly-OH (M.W. 365.43) $C_{22}H_{23}NO_4$ [220497-61-0]	FPG-1901-PI 4 °C	1 g
Fmoc-Dap(Octanoyl)-OH N^{α}-9-Fluorenylmethoxycarbonyl-N^{β}-Octanoyl-L-2,3-diaminopropionic acid (M.W. 452.56) $C_{26}H_{32}N_2O_5$	FDO-1909-PI 4 °C	1 g
Fmoc-Lys-(Dabcyl)-OH N^{α}-9-Fluorenylmethoxycarbonyl-N^{ε}-(4,4-dimethylazobenzene-4'carbonyl)-L-Lysine (M.W. 619.73) $C_{36}H_{37}N_5O_5$ [146998-27-8]	FKD-1908-PI 4 °C	1 g

PRODUCT	CODE	QTY



dPEG® (discrete Polyethylene Glycol) Pegylation Reagents

Peptides International is pleased to offer monodisperse, discrete PEG derivatives (dPEG®) to our colleagues around the world. Through a distribution agreement with Quanta BioDesign, dPEG® reagents complements the synthetic portfolio of PI offerings. PI and Quanta anticipate continued development of new materials for applications in peptide chemistry. Please contact us for further information or to discuss a new project idea.

Polyethylene glycol (PEG) is a polymer made from condensation of ethylene oxide and has been used in a wide variety of well-known consumer products. PEG's hydrophilic and weak immunogenic properties make it ideal for drug delivery and new therapies. The attachment of PEG linkers to therapeutic proteins can confer these properties upon the modified protein, increasing stability and half-life *in vivo*. However, PEG polydispersity and the resulting highly heterogeneous mixtures, adversely affect cost and production aspects of drug development. Attempts to synthesize monodisperse PEG have been limited by long reaction times, low yields and unwanted by-products.

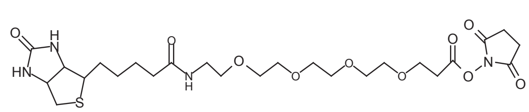
Quanta BioDesign has developed efficient and rapid methods for chemical synthesis of monodisperse, discrete PEG, or dPEG®, of any specific MW. The dPEG®s are not purified from a polymeric mixture and hence contain no other PEG homologues (only the one selected as the desired product), resulting in a single compound with a single molecular weight. Using dPEG®s should significantly decrease cost and time associated with synthesis by reducing problems associated with using conventional PEGs. Peptides International is now offering dPEG® derivatives, carefully selected for your protein labeling and peptide synthetic needs.

dPEG® (discrete Polyethylene Glycol) Pegylation Reagents

NHS-dPEG®$_4$ Biotin — DPG-5701-PI — 4 °C — 50 mg, 1 g

Chain length from amide to terminal carbonyl is 19.2 Angstroms.
Ideal spacer length for binding streptavidin conjugates
(M.W. 588.67)
Amine Reactive Biotinylation Reagent

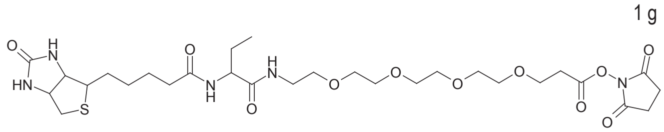
Greg T. Hermanson, *Bioconjugate Techniques*, Academic Press, Inc., San Diego, CA, (1996).



NHS-dPEG®$_4$ Biotinidase-Resistant Biotin — DPG-5702-PI — 4 °C — 50 mg, 500 mg, 1 g

Chain length from amide to terminal carbonyl is 19.2 Angstroms.
Ideal spacer length for binding streptavidin conjugates
(M.W. 673.78)
Amine Reactive Biotinylation Reagent

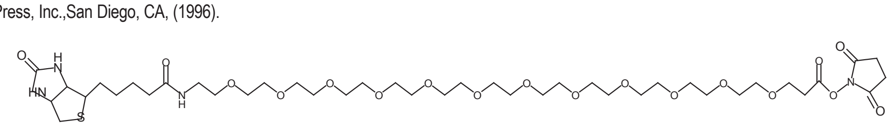
D. Scott Wilbur, *et al.*, *Bioconjugate Chemistry*, **17**(6), 1514-1522 (2006).



NHS-dPEG®$_{12}$ Biotin — DPG-5703-PI — 4 °C — 25 mg, 500 mg, 1 g

47.6 Angstrom spacer
(M.W. 941.09)
Amine Reactive Biotinylation Reagent

Greg T. Hermanson, *Bioconjugate Techniques*, Academic Press, Inc.,San Diego, CA, (1996).

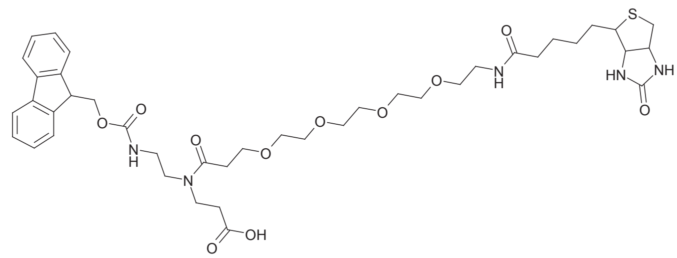


PRODUCT	CODE	QTY

Fmoc-Amido-(dPEG®$_4$ Biotin) Acid

Spacer properties: 18.1 Angstrom, 17 atoms
(M.W. 827.98)
Biotinylation Reagent for Peptide Synthesis

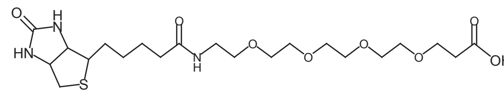
CODE	QTY
DPG-5704-PI (4 °C)	50 mg
	100 mg
	1 g



dPEG®$_4$ Biotin Acid

Chain length from amide to terminal carbonyl is 19.2 Angstroms.
(M.W. 491.60)

CODE	QTY
DPG-5705-PI (4 °C)	50 mg
	1 g

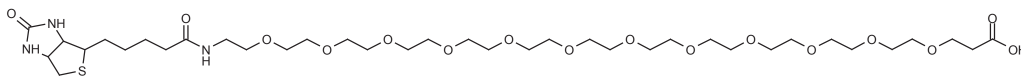


dPEG®$_{12}$ Biotin Acid

47.6 Angstrom spacer
(M.W. 844.02)
Amine Reactive Biotinylation Reagent; Activate in situ

Greg T. Hermanson, *Bioconjugate Techniques*, Academic Press, Inc.,San Diego, CA, (1996).

CODE	QTY
DPG-5706-PI (4 °C)	50 mg
	1 g

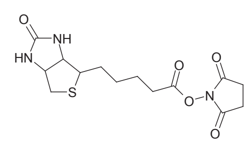


NHS-Biotin

(M.W. 341.38)
Amine Reactive Label with Aliphatic Spacer

Greg T. Hermanson, *Bioconjugate Techniques*, Academic Press, Inc.,San Diego, CA, (1996).

CODE	QTY
DPG-5707-PI (4 °C)	100 mg
	1 g

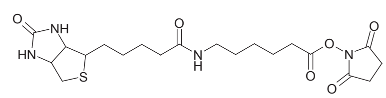


NHS-LC-Biotin

8.8 Angstrom spacer
(M.W. 454.54)
Amine Reactive Label with Extended Aliphatic Spacer

Greg T. Hermanson, *Bioconjugate Techniques*, Academic Press, Inc.,San Diego, CA, (1996).

CODE	QTY
DPG-5708-PI (4 °C)	50 mg
	1 g



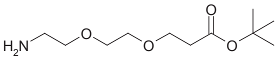
PRODUCT	CODE	QTY

Carbonyl / Carboxyl Reactive Reagents

Amino-dPEG®$_2$ *t*-Butyl Ester

10.9 Angstroms and 10 atoms spacer (nitrogen to carbonyl carbon)
(M.W. 233.30)
Carboxy-Protected dPEG®$_2$ Amino Acid

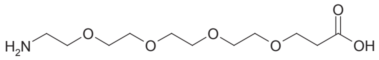
CODE	QTY
DPG-5709-PI (4 °C)	100 mg
	500 mg
	1 g



Amino-dPEG®$_4$ Acid

18.0 Angstrom and 16 atoms spacer
(M.W. 265.30)
Unprotected dPEG®$_4$ Amino Acid

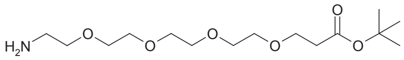
CODE	QTY
DPG-5710-PI (4 °C)	100 mg
	500 mg
	1 g



Amino-dPEG®$_4$ *t*-Butyl Ester

18.0 Angstroms and 16 atoms spacer (nitrogen to carbonyl carbon)
(M.W. 321.41)
Carboxy-Protected dPEG®$_4$ Amino Acid

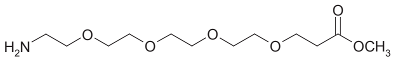
CODE	QTY
DPG-5711-PI (4 °C)	100 mg
	500 mg
	1 g



Amino-dPEG®$_4$ Methyl Ester

18.0 Angstroms and 16 atoms spacer (nitrogen to carbonyl carbon)
(M.W. 279.33)
Carboxy-Protected dPEG®$_4$ Amino Acid

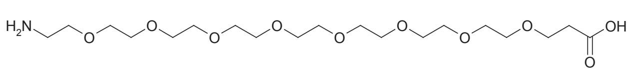
CODE	QTY
DPG-5712-PI (4 °C)	100 mg
	500 mg
	1 g



Amino-dPEG®$_8$ Acid

32.2 Angstroms and 28 atoms spacer (nitrogen to carbonyl carbon)
(M.W. 441.51)
Unprotected dPEG®$_8$ Amino Acid

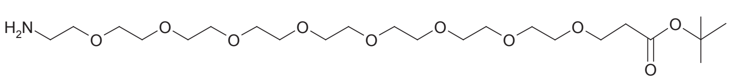
CODE	QTY
DPG-5713-PI (4 °C)	100 mg
	1 g



Amino-dPEG®$_8$ *t*-Butyl Ester

32.2 Angstroms and 28 atoms spacer (nitrogen to carbonyl carbon)
(M.W. 497.62)
Carboxy-Protected dPEG®$_8$ Amino Acid

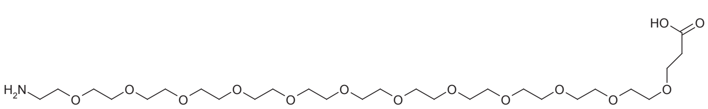
CODE	QTY
DPG-5714-PI (4 °C)	100 mg
	500 mg
	1 g



Amino-dPEG®$_{12}$ Acid

46.5 Angstroms and 40 atoms spacer
(M.W. 617.72)
Unprotected dPEG®$_{12}$ Amino Acid

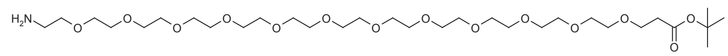
CODE	QTY
DPG-5715-PI (4 °C)	100 mg
	1 g



PRODUCT	CODE	QTY

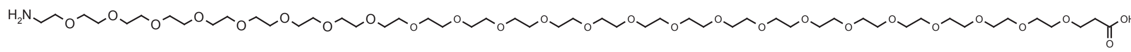
Amino-dPEG®$_{12}$ *t*-Butyl Ester
DPG-5716-PI — 4 °C — 100 mg / 500 mg / 1 g

46.5 Angstroms and 40 atoms spacer (nitrogen to carbonyl carbon)
(M.W. 673.83)
Carboxy-Protected dPEG®$_{12}$ Amino Acid



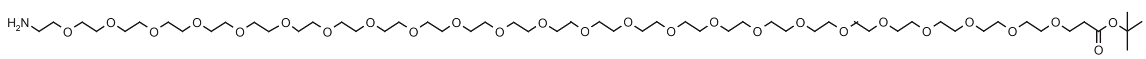
Amino-dPEG®$_{24}$ Acid
DPG-5717-PI — 4 °C — 100 mg / 1 g

89 Angstroms and 76 atoms spacer
(M.W. 1146.35)
Unprotected dPEG®$_{24}$ Amino Acid



Amino-dPEG®$_{24}$ *t*-Butyl Ester
DPG-5718-PI — 4 °C — 100 mg / 1 g

89 Angstroms and 76 atoms spacer (nitrogen to carbonyl carbon)
(M.W. 1202.46)
Carboxy-Protected dPEG® Amino Acid



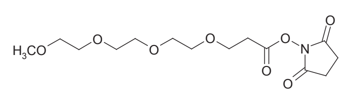
Methoxy Terminated Amine Reactive Reagents

NHS-m-dPEG® (MW = 245)
DPG-5719-PI — 4 °C — 100 mg / 500 mg / 1 g

Methoxy-dPEG®-*N*-Hydroxysuccinimide (MW=245)
8.5 Angstroms and 8 atoms spacer
(M.W. 245.23)

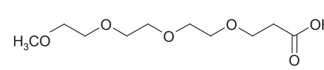
NHS-m-dPEG® (MW = 333)
DPG-5720-PI — 4 °C — 100 mg / 500 mg / 1 g

Methoxy-dPEG®-*N*-Hydroxysuccinimide (MW=333)
15.6 Angstroms and 14 atoms spacer
(M.W. 333.33)



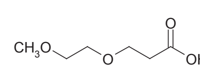
m-dPEG® (MW = 236)
DPG-5721-PI — 4 °C — 250 mg / 1 g

Methoxy-dPEG® (MW=236)
15.6 Angstroms and 14 atoms spacer
(M.W. 236.26)
Acid form of NHS Ester, DPG-5720-PI



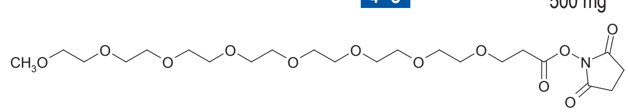
m-dPEG® Acid (MW = 148)
DPG-5722-PI — 4 °C — 100 mg / 500 mg / 1 g

8.5 Angstroms and 8 atoms spacer
(M.W. 148.16)
Acid form of NHS Ester, DPG-5719-PI

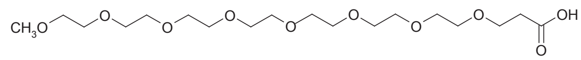


NHS-m-dPEG® (MW = 509)
DPG-5723-PI — 4 °C — 100 mg / 500 mg

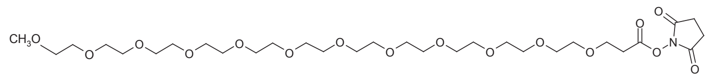
Methoxy-dPEG®-*N*-Hydroxysuccinimide (MW=509)
29.8 Angstroms and 26 atoms spacer
(M.W. 509.54)
Amine Reactive



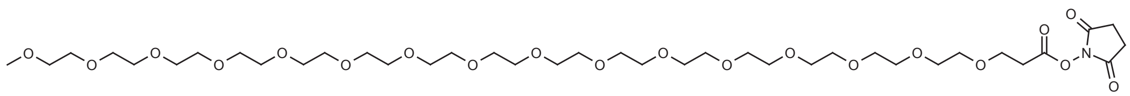
PRODUCT	CODE	QTY
m-dPEG® acid (MW = 412) 29.8 Angstroms and 26 atoms spacer (M.W. 412.47) *Acid form of NHS Ester, DPG-5723-PI*	**DPG-5724-PI** 4 °C	100 mg 1 g



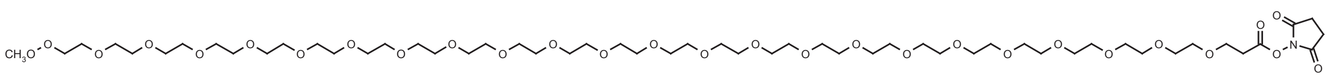
PRODUCT	CODE	QTY
NHS-m-dPEG® (MW = 685) Methoxy-dPEG®-*N*-Hydroxysuccinimide (MW=685) 44.0 Angstroms and 38 atoms spacer (M.W. 685.75) *Amine Reactive*	**DPG-5725-PI** 4 °C	100 mg 1 g



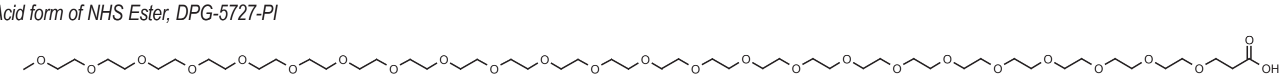
PRODUCT	CODE	QTY
NHS-m-dPEG® (MW = 862) Methoxy-dPEG®-*N*-Hydroxysuccinimide (MW=862) 57.9 Angstroms and 50 atoms spacer (M.W. 861.97) *Amine Reactive*	**DPG-5726-PI** 4 °C	100 mg 1 g



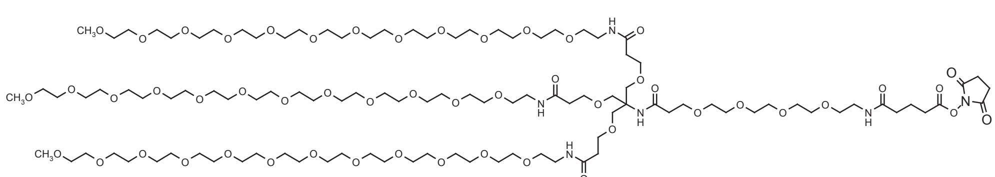
PRODUCT	CODE	QTY
NHS-m-dPEG® (MW = 1214) Methoxy-dPEG®-*N*-Hydroxysuccinimide (MW=1214) 86.2 Angstroms and 74 atoms spacer (M.W. 1214.39) *Amine Reactive*	**DPG-5727-PI** 4 °C	100 mg 500 mg 1 g



PRODUCT	CODE	QTY
m-dPEG® acid (MW = 1117) Methoxy-dPEG®-*N*-Hydroxysuccinimide (MW=1117) 86.2 Angstroms and 74 atoms spacer (M.W. 117.31) *Acid form of NHS Ester, DPG-5727-PI*	**DPG-5728-PI** 4 °C	100 mg 500 mg 1 g



PRODUCT	CODE	QTY
NHS-dPEG®$_4$-(m-dPEG®$_{12}$)$_3$ Ester (M.W. 2420.80) *Amine Reactive*	**DPG-5729-PI** 4 °C	100 mg 1 g



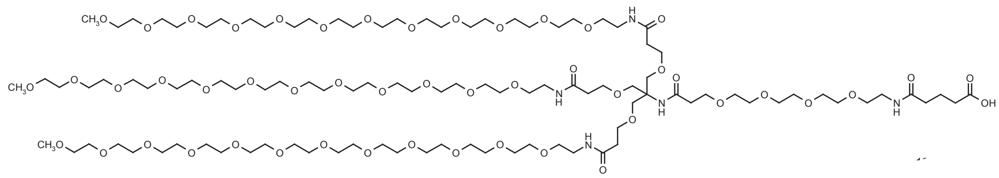
- *Single compound; made synthetically from 99.5% pure tetraethylene glycol*
- *Imparts significant and surprising water solubility, and the modifier itself is non-immunogenic and non-toxic*
- *Potentially very useful as a drug modifier with high hydrodynamic volume*
- *Produces compounds with reduced aggregation, or surfaces with reduced non-specific binding*
- *Produces stable amide bond*

PRODUCT	CODE	QTY

Carboxyl-dPEG®$_4$-(m-dPEG®$_{12}$)$_3$ Ester

(M.W. 2323.73)
Amine Reactive

DPG-5730-PI — 4 °C — 100 mg, 1 g



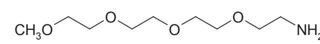
- *Single compound; made synthetically from 99.5% pure tetraethylene glycol*
- *Imparts significant and surprising water solubility, and the modifier itself is non-immunogenic and non-toxic*
- *Potentially very useful as a drug modifier with high hydrodynamic volume*
- *Produces compounds with reduced aggregation, or surfaces with reduced non-specific binding*
- *Produces stable amide bond*
- *Activate* in situ *with EDC/NHS*

Methoxy Terminated Carbonyl / Carboxyl Reactive Reagents

m-dPEG®$_4$ Amine

15.5 Angstroms and 14 atoms spacer
(M.W. 207.27)*http://pepnet.com/*

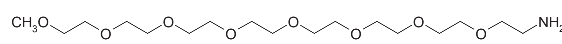
DPG-5731-PI — 4 °C — 100 mg, 500 mg, 1 g



m-dPEG®$_8$ Amine

29.7 Angstroms and 26 atoms spacer
(M.W. 383.48)

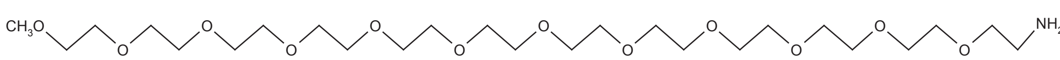
DPG-5732-PI — 4 °C — 100 mg, 1 g



m-dPEG®$_{12}$ Amine

43.9 Angstroms and 38 atoms spacer
(M.W. 559.69)
Carbonyl / Carboxyl Reactive

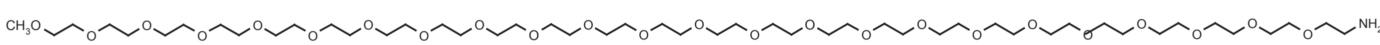
DPG-5733-PI — 4 °C — 100 mg, 1 g



m-dPEG®$_{24}$ Amine

86.1 Angstroms and 74 atoms spacer
(M.W. 1088.32)
Carbonyl / Carboxyl Reactive

DPG-5734-PI — 4 °C — 100 mg, 1 g

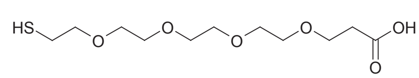


Surface Reactive and Thiophilic Reagents

Thiol-dPEG®$_4$ Acid

18.3 Angstroms and 16 atoms spacer
(M.W. 282.35)
Bifunctional Thiol Acid with dPEG® Spacer

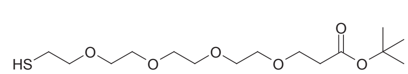
DPG-5735-PI — 4 °C — 100 mg, 1 g



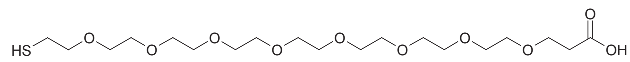
Thiol-dPEG®$_4$ *t*-Butyl Ester

(M.W. 338.46)
Bifunctional Thiol and Protected Acid with dPEG® Spacer

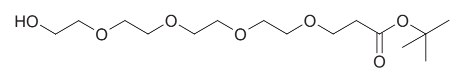
DPG-5736-PI — 4 °C — 100 mg, 500 mg, 1 g



PRODUCT	CODE	QTY
Thiol-dPEG®$_8$ Acid 32.5 Angstroms and 28 atoms spacer (M.W. 458.57) *Bifunctional Thiol Acid with dPEG® Spacer*	DPG-5737-PI 4 °C	100 mg 500 mg 1 g

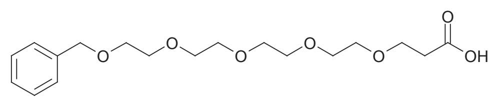


PRODUCT	CODE	QTY
Hydroxy-dPEG®$_4$ *t*-Butyl Ester 18.0 Angstroms and 16 atoms spacer (M.W. 322.39) *Surface Modification Reagent with Free Alcohol*	DPG-5738-PI 4 °C	1 g



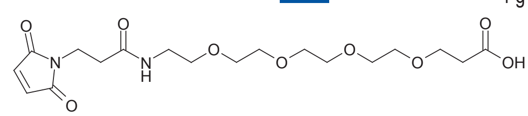
Miscellaneous Reagents

PRODUCT	CODE	QTY
***O*-Benzyl-dPEG®$_4$ Acid** 17.9 Angstroms and 16 atoms spacer (M.W. 356.41) *Amine Reactive Modifier / Spacer*	DPG-5739-PI 4 °C	100 mg 500 mg 1 g



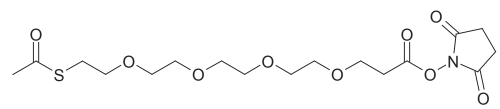
Heterobifunctional discrete polyethylene glycol (PEG) dPEG®

PRODUCT	CODE	QTY
MAL-dPEG®4-Acid Mol. Wt.: 416.42; single compound 17.5 Angstromsand 16 atomsspacer *Pegylation Crosslinker Reagent with Amine and Sulfhydryl / Thiol Reactivity* • Activate the carboxyl *in situ* with EDC/NHS or other activation chemistry of the carboxylic acid	DPG-5763-PI 4 °C	100 mg 1 g

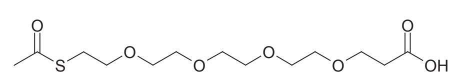


Heterobifunctional dPEG® Crosslinkers

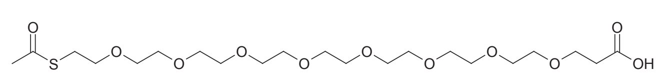
PRODUCT	CODE	QTY
S-Acetyl-dPEG®$_4$ NHS Ester (dPEG®$_4$ SATA) 18.3 Angstroms and 16 atoms spacer (M.W. 421.46)	DPG-5740-PI 4 °C	100 mg 500 mg 1 g



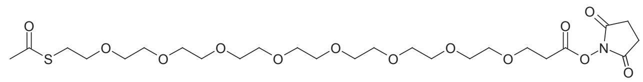
PRODUCT	CODE	QTY
S-Acetyl-dPEG®$_4$ Acid (dPEG®$_4$ SATA Acid) 18.3 Angstroms and 16 atoms spacer (M.W. 324.39)	DPG-5741-PI 4 °C	100 mg 500 mg 1 g



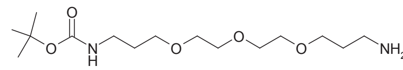
PRODUCT	CODE	QTY
S-Acetyl-dPEG®$_8$ Acid (dPEG®$_8$ SATA Acid) 32.5 Angstroms and 28 atoms spacer (M.W. 500.60)	DPG-5742-PI 4 °C	100 mg 500 mg 1 g



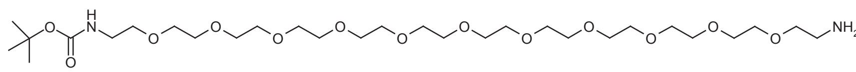
PRODUCT	CODE	QTY
S-Acetyl-dPEG®$_8$ NHS Ester (dPEG®$_8$ SATA) 32.5 Angstroms and 28 atoms spacer (M.W. 597.67)	DPG-5743-PI 4 °C	100 mg 1 g



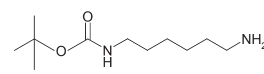
PRODUCT	CODE	QTY
Mono-*N*-*t*-Boc-Amido-dPEG®$_3$ Amine 15 Angstroms and 16.9 atoms spacer (M.W. 320.43)	DPG-5744-PI 4 °C	500 mg 1 g



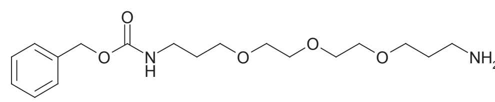
PRODUCT	CODE	QTY
Mono-*N*-*t*-Boc-Amido-dPEG®$_1$ Amine 42.8 Angstroms and 37 atoms spacer (M.W. 644.79)	DPG-5745-PI 4 °C	100 mg 1 g



PRODUCT	CODE	QTY
Mono-*t*-Boc-1,6-Diaminohexane 42.8 Angstroms and 37 atoms spacer (M.W. 216.32)	DPG-5746-PI 4 °C	1 g

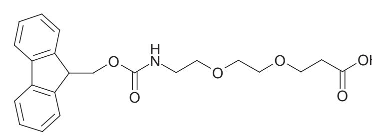


PRODUCT	CODE	QTY
Mono-*N*-Cbz-Amido-dPEG®$_3$ Amine 16.9 Angstroms and 15 atoms spacer (M.W. 354.44)	DPG-5747-PI 4 °C	500 mg 1 g

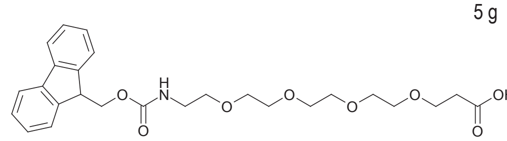


dPEG® Peptide Synthesis Reagents with Spacers
Fmoc-Based Solid Phase Synthesis

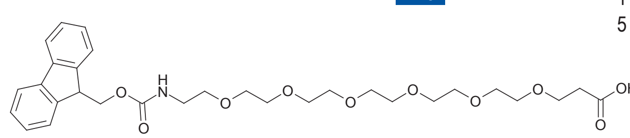
PRODUCT	CODE	QTY
Fmoc-Amido-dPEG®$_2$ Acid 10.9 Angstroms and 10 atoms spacer (M.W. 399.44)	DPG-5748-PI 4 °C	1 g 5 g



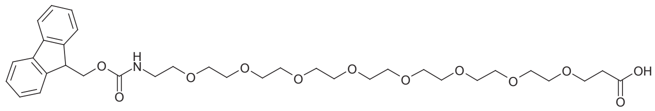
PRODUCT	CODE	QTY
Fmoc-Amido-dPEG®$_4$ Acid 18.1 Angstroms and 17 atoms spacer (M.W. 487.54)	DPG-5749-PI 4 °C	100 mg 1 g 5 g



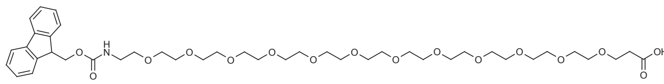
PRODUCT	CODE	QTY
Fmoc-Amido-dPEG®$_6$ Acid 25.1 Angstroms and 22 atoms spacer (M.W. 575.65) *N-Fmoc protected hydrophilic, non-immunogenic spacer*	DPG-5750-PI 4 °C	100 mg 1 g 5 g



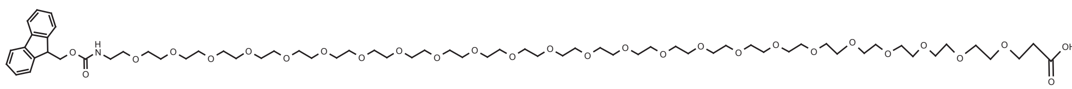
PRODUCT	CODE	QTY
Fmoc-Amido-dPEG®$_8$ Acid 32.2 Angstroms and 28 atoms spacer (M.W. 663.75) *N-Fmoc protected hydrophilic, non-immunogenic spacer*	DPG-5751-PI 4 °C	100 mg 1 g



Fmoc-Amido-dPEG®$_{12}$ Acid 46.5 Angstroms and 40 atoms spacer (M.W. 839.96) *N-Fmoc protected hydrophilic, non-immunogenic spacer*	DPG-5752-PI 4 °C	100 mg 1 g

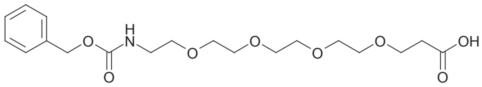


Fmoc-Amido-dPEG®$_{24}$ Acid 89 Angstroms and 76 atoms spacer (M.W. 1368.59) *N-Fmoc protected hydrophilic, non-immunogenic spacer*	DPG-5753-PI 4 °C	100 mg 1 g

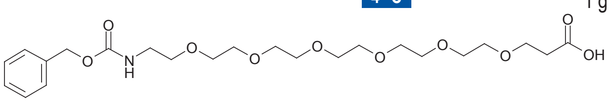


Cbz-Based Solid Phase Synthesis

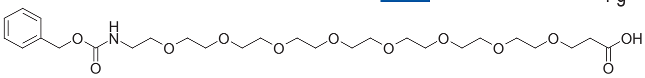
Cbz-Amido-dPEG®$_4$ Acid 19.2 Angstroms and 17 atoms spacer (M.W. 399.44) *N-Cbz protected hydrophilic, non-immunogenic spacer*	DPG-5754-PI 4 °C	100 mg 1 g



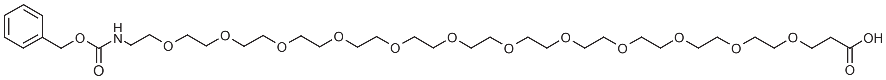
Cbz-Amido-dPEG®$_6$ Acid 25.1 Angstroms and 22 atoms spacer (M.W. 487.54) *N-Cbz protected hydrophilic, non-immunogenic spacer*	DPG-5755-PI 4 °C	100 mg 1 g



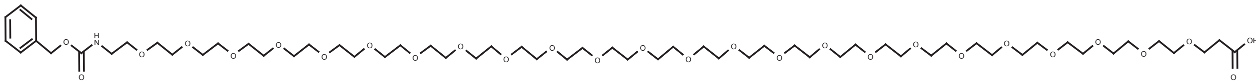
Cbz-Amido-dPEG®$_8$ Acid 32.2 Angstroms and 28 atoms spacer (M.W. 575.65) *N-Cbz Protected Hydrophilic, Non-Immunogenic Spacer*	DPG-5756-PI 4 °C	100 mg 1 g



Cbz-Amido-dPEG®$_{12}$ Acid 46.5 Angstroms and 40 atoms spacer (M.W. 751.86) *N-Cbz Protected Hydrophilic, Non-Immunogenic Spacer*	DPG-5757-PI 4 °C	100 mg 1 g



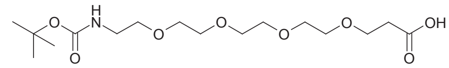
Cbz-Amido-dPEG®$_{24}$ Acid 88.5 Angstroms and 76 atoms spacer (M.W. 1280.49) *N-Cbz Protected Hydrophilic, Non-Immunogenic Spacer*	DPG-5758-PI 4 °C	100 mg 1 g



PRODUCT	CODE	QTY

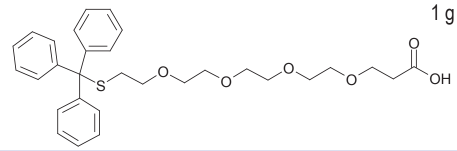
Merrifield Boc-Based Solid Phase Synthesis

Product	Code	Qty
t-Boc-Amido-dPEG$^{®}_{4}$ Acid 19.2 Angstroms and 17 atoms spacer (M.W. 365.42) *N-t-Boc Protected Hydrophilic, Non-Immunogenic Spacer*	**DPG-5759-PI** 4 °C	100 mg 1 g 5 g

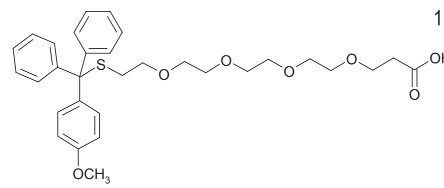


Thiol Modifiers

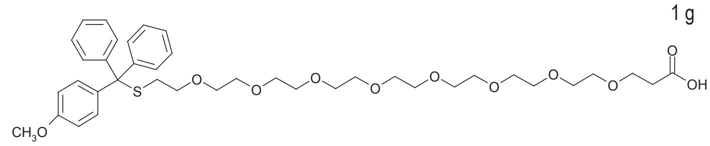
Product	Code	Qty
Trityl-S-dPEG$^{®}_{4}$ Acid 18.3 Angstroms and 16 atoms spacer (M.W. 524.67)	**DPG-5760-PI** 4 °C	100 mg 500 mg 1 g



Product	Code	Qty
Methoxytrityl-S-dPEG$^{®}_{4}$ Acid 18.3 Angstroms and 16 atoms spacer (M.W. 554.70)	**DPG-5761-PI** 4 °C	100 mg 500 mg 1 g

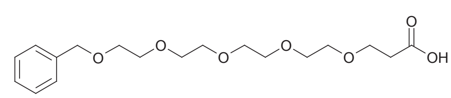


Product	Code	Qty
Methoxytrityl-S-dPEG$^{®}_{8}$ Acid 32.5 Angstroms and 28 atoms spacer (M.W. 730.91)	**DPG-5762-PI** 4 °C	100 mg 500 mg 1 g



Hydroxyl Modifiers

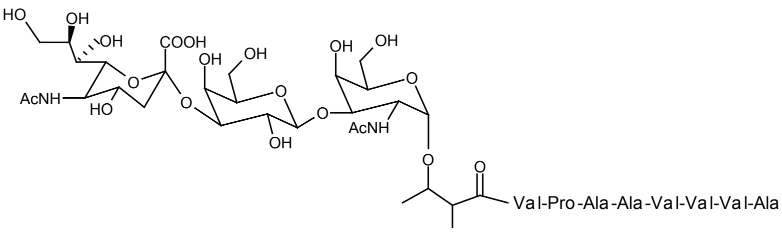
Product	Code	Qty
O-Benzyl-dPEG$^{®}_{4}$ Acid 18 Angstroms and 16 atoms spacer (M.W. 356.41)	**DPG-5739-PI** 4 °C	100 mg 500 mg 1 g



Carbohydrates and Conjugates

Antiproliferative Factor

Antiproliferative factor (APF) (*CAR-24007*) is a low molecular weight, heat stable sialoglycopeptide that contains the transmembrane segment of Frizzled 8. It is made and secreted by bladder epithelial cells of patients with a condition known as interstitial cystitis (IC) which causes chronic pain due to ulcers, hemorrhaging, and thinning of the bladder epithelium.[1,2] APF contributes to the pathology of IC by inhibiting bladder cell proliferation, and was also shown to regulate proliferation of bladder carcinoma cells.[2,3] Recently, CKAP4/p63 was identified as a receptor for APF, but how its activity is mediated remains unknown.[4]



APF's role as a negative regulator makes it a possible target for treatment of disease, and its unique presence in the urine of IC patients indicates it is a biomarker that may lead to a diagnostic tool for those suffering with IC. Chemists in the division of carbohydrate chemistry at the Peptide Institute achieved the total synthesis of this sialoglycopeptide, APF. In addition to other carbohydrate related products, APF is now available to aid in IC research. *http://pepnet.com/products/carbohydrates.pdf*

1. S.K. Keay, Z. Szekely, T.P. Conrads, T. D. Veenstra, J.J. Barchi, Jr., C.-O. Zhang, K.R. Koch, and C.J. Michejda, *Proc. Natl. Acad. Sci.U. S. A.*, **101**, 11803 (2004).
2. S. Keay, M. Kleinberg, C.-O. Zhang, M.K. Hise, and J.W. Warren, *J. Urol.*, **64**, 2112 (2000).
3. S. Keay, C.-O. Zhang, M. Hise, A.L. Trifillis, J.R. Hebel, S.C. Jacobs, and J. R. Warren, *J. Urol.*, **156**, 2073 (1996).
4. T.P. Conrads, G.M. Tocci, B.L. Hood, C.-O. Zhang, L. Guo, K.R. Koch, C.J. Michejd, T.D. Veenstra, and S.K. Keay, *J. Biol. Chem.*, **281**, 7836 (2006).

Antiproliferative Factor Sialoglycopeptide

CAR-24007-v — -20 °C — 50 µg vial

(Ammonium Form)
Thr[Neu5Acα(2→3)Galβ(1→3)GalNAcα(1→O)][541]-Frizzled 8 (541-549)*O*-(Acetamido-3,5-dideoxy-D-glycero-α-D-galacto-2-nonulopyranosylonic acid)-(2→3)-*O*-β-D-galactopyranosyl-(1→3)-*O*-α-2-acetamido-2-deoxy-D-galactopyranosyl-(1→O)-Thr-Val-Pro-Ala-Ala-Val-Val-Val-Ala
(M.W. 1482.6) $C_{63}H_{107}N_{11}O_{29}$
Antiproliferative Factor from Interstitial Cystitis Patients

Phenyltrifluoroacetimidate Glycosyl Donor

CAR-22102 — -20 °C — 5 mg, 1 g

Methyl 4,7,8,9-Tetra-*O*-Acetyl-3,5-Dideoxy-5-(2,2,2-Trichloroethoxycarbonylamino)-D-Glycero-D-Galacto-2-Nonulopyranosylonate-2-*N*-Phenyltrifluoroacetimidate
(M.W. 795.92) $C_{29}H_{32}N_2O_{14}Cl_3F_3$
Synthetic Product
Glycosyl Donor (Phenyltrifluoroacetimidate)

K. Tanaka, T. Goi, and K. Fukase, *Synlett*, **2958** (2005). (*Original; Synthesis*)
S. Tanaka, T. Goi, K. Tanaka, and K. Fukase, *J. Carbohydr. Chem.*, **26**, 369 (2007). (*Synthesis*)

Fmoc-Ser[Ac$_4$Galβ(1- >3)Ac$_2$GalNAcα(1- >O)]-OH

CAR-22103 — -20 °C — 25 mg

O-β-2,3,4,6-Tetra-*O*-Acetyl-D-Galactopyranosyl-(1- >3)-*O*-α- 4,6- Di-*O*-Acetyl- 2- Acetamido-2-Deoxy-D-Galactopyranosyl-(1- >O)-9-Fluorenylmethoxycarbonyl-L-Serine
(M.W. 944.88) $C_{44}H_{52}N_2O_{21}$
Synthetic Product
Reagent for Mucin-Type O-Glycopeptide Synthesis

T. Reipen and H. Kunz, *Synthesis*, **2487** (2003).

Fmoc-Thr[Ac$_4$Galβ(1- >3)Ac$_2$GalNAcα(1- >O)] -OH-*O*-β-2,3,4,6-Tetra-O-Acetyl-D-Galactopyranosyl-(1- >3)-*O*-α-4,6-Di-*O*-Acetyl-2-Acetamido-2-Deoxy-D-Galactopyranosyl-(1- >O)-9-Fluorenylmethoxycarbonyl-L-Threonine

CAR-22104 — -20 °C — 25 mg

(M.W. 958.91) $C_{45}H_{54}N_2O_{21}$
Synthetic Product
Reagent for Mucin-Type O-Glycopeptide Synthesis

C. Brocke and H. Kunz, *Synthesis*, **525** (2004).

PRODUCT	CODE	QTY

2-NBDG and 2-NBDLG

Monitoring Glucose Uptake into Single, Living Cells
Now Available with Antipode
2-[*N*-(7-Nitrobenz-2-Oxa-1,3-Diazol-4-yl)Amino]-2-Deoxy-D-Glucose [2-NBDG] is a fluorescent tracer for monitoring D-Glucose uptake into single, living cells. In addition to this widely used product, its antipodal control compound, 2-[*N*-(7-Nitrobenz-2-Oxa-1,3-Diazol-4-yl)Amino]-2-Deoxy-L-Glucose [2-NBDLG] is exclusively manufactured by a newly developed synthetic method of the Peptide Institute, and is now available for research applications.

2-NBDG

CKG-23002-v (-20 °C) — 0.5 mg vial

2-[*N*-(7-Nitrobenz-2-Oxa-1,3-Diazol-4-yl)Amino]-2-Deoxy-D-Glucose
(M.W. 342.26) $C_{12}H_{14}N_4O_8$
Reagent for Monitoring Glucose Uptake into Single, Living Cells

K. Yoshioka, H. Takahashi, T. Homma, M. Saito, K.-B. Oh, Y. Nemoto, and H. Matsuoka, *Biochim. Biophys. Acta*, **1289**, 5 (1996). (*Original*)
K. Yamada, M. Nakata, N. Horimoto, M. Saito, H. Matsuoka, and N. Inagaki, *J. Biol. Chem.*, **275**, 22278 (2000).
(*Measurement of Glucose Uptake in Living Mammalian Cells*)
K. Yamada, M. Saito, H. Matsuoka, and N. Inagaki, *Nature Protocols*, **2**, 753 (2007). (*Chem. Synthesis & Protocols for Measurement*)
J.V. Rocheleau, G.M. Walker, W.S. Head, O.P. McGuinness, and D.W. Piston, *Proc. Natl. Acad. Sci. U.S.A.*, **101**, 12899 (2004).
(*Monitoring of Glucose Uptake and NAD(P)H Response in Islet*)
- *This compound is distributed through Peptide Institute, Inc. under the license of Hirosaki University Graduate School of Medicine, Tokyo University of Agriculture and Technology, and the Peptide Institute, Inc*

2-NBDLG

CKG-23003-v (-20 °C) — 0.5 mg vial

2-[*N*-(7-Nitrobenz-2-Oxa-1,3-Diazol-4-yl)Amino]-2-Deoxy-L-Glucose
(M.W. 342.26) $C_{12}H_{14}N_4O_8$
Control Substrate for 2-NBDG

T. Yamamoto, Y. Nishiuchi, T. Teshima, H. Matsuoka, and K. Yamada, *Tetrahedron Lett.*, **49**, 6876 (2008). (*Original*)
K. Yamada, M. Saito, H. Matsuoka, and N. Inagaki, *Nature Protocols*, **2**, 753 (2007). (*Protocols for Measurement*)
- *This compound is distributed through Peptide Institute, Inc. under the license of Hirosaki University Graduate School of Medicine, Tokyo University of Agriculture and Technology, and the Peptide Institute, Inc*

Lipid A

Lipid A (*Salmonella*)

CLP-24008-s (-20 °C) — 0.1 mg vial

(Triethylammonium Form)
2- Deoxy-6-*O*-[2-deoxy-2-[(*R*)-3-(dodecanoyloxy)tetradecanoylamino]-3-*O*-[(*R*)-3-(tetradecanoyloxy)tetradecanoyl]-β-D-glucopyranosyl]-3-*O*-[(*R*)-3-hydroxytetradecanoyl]-2-[(*R*)-3-(hexadecanoyloxy)tetradecanoylamino]-β-D-glucopyranose 1,4\'- diphosphate
(M.W. 2036.80) $C_{110}H_{208}N_2O_{26}P_2$
Synthetic Product
Active Principle of Endotoxin

U. Seydel, B. Lindner, H.-W. Wollenweber, and E.T. Rietschel, *Eur. J. Biochem.*, **145**, 505 (1984). (*Original; Chem. Structure*)
A.X. Tran, M.E. Lester, C.M. Stead, C.R.H. Raetz, D.J. Maskell, S.C. McGrath, R.J. Cotter, and M.S. Trent, *J. Biol. Chem.*, **280**, 28186 (2005). (*Pharmacol.*)
Y. Shi, M.J. Cromie, F.-F. Hsu, J. Turk, and E.A. Groisman, *Mol. Microbiol.*, **53**, 229 (2004). (*Pharmacol.*)
H.S. Gibbons, S. Lin, R.J. Cotter, and C.R.H. Raetz, *J. Biol. Chem.*, **275**, 32940 (2000). (*Pharmacol.*)

UDP-β-L-Arabinofuranose

UDP-β-L-Arabinofuranose

CKG-23005-s (-20 °C) — 0.1 mg vial

Uridine-5'-diphospho-β-L-arabinofuranose
(Triethylammonium Form)
(M.W. 536.28) $C_{14}H_{22}N_2O_{16}P_2$
Synthetic Product
Reagent for Research in Arabinofuranose Biogenesis in Plants

T. Konishi, H. Ono, M. Ohnishi-Kameyama, S. Kaneko, and T. Ishii, *Plant Physiol.*, **141**, 1098 (2006). (*Substrate for Arabinofuranosyltransferase*)
T. Konishi, T. Takeda, Y. Miyazaki, M. Ohnishi-Kameyama, T. Hayashi, M.A. O'Neill, and T. Ishii, *Glycobiol.*, **17**, 345 (2007). (*Use in Enzymatic Furanose-Pyranose Interconversion*)
Q. Zhang and H.-W. Liu, *Bioorg. Med. Chem. Lett.*, **11**, 145 (2001). (*Chem. Synthesis*)

Biologically Active Peptides

Adropin

Adropin (Human, 34-76)

PAP-4456-s -20 °C — 0.1 mg vial

Cys-His-Ser-Arg-Ser-Ala-Asp-Val-Asp-Ser-Leu-Ser-Glu-Ser-Ser-Pro-Asn-Ser-Ser-Pro-Gly-Pro-Cys-Pro-Glu-Lys-Ala-Pro-Pro-Pro-Gln-Lys-Pro-Ser-His-Glu-Gly-Ser-Tyr-Leu-Leu-Gln-Pro

(M.W. 4499.80) $C_{190}H_{293}N_{55}O_{68}S_2$

(Disulfide bond between Cys^1-Cys^{23})

Synthetic Product

Regulatory Factor in Energy Homeostasis

K.G. Kumar, J.L. Trevaskis, D.D. Lam, G.M. Sutton, R.A. Koza, V.N. Chouljenko, K.G. Kousoulas, P.M. Rogers, R.A. Kesterson, M. Thearle, A.W. Ferrante, Jr., R.L. Mynatt, T.P. Burris, J.Z. Dong, H.A. Halem, M.D. Culler, L.K. Heisler, and J.M. Stephens, *Cell Metab.*, **8**, 468 (2008). (*Original: Primary Structure/Pharmacol.*)

Alarin

Alarin

PAL-4449-s -20 °C — 0.1 mg vial

Ala-Pro-Ala-His-Arg-Ser-Ser-Thr-Phe-Pro-Lys-Trp-Val-Thr-Lys-Thr-Glu-Arg-Gly-Arg-Gln-Pro-Leu-Arg-Ser

APAHRSSTFPKWVTKTERGRQPLRS

(M.W. 2894.30) $C_{127}H_{205}N_{43}O_{35}$

Synthetic Product

Vasoactive Peptide / Splice Variant of Galanin-Like Peptide

R. Lang, A.L. Gundlach, and B. Kofler, *Pharmacol. Ther.*, **115**, 177 (2007). (*Review*)
R. Santic, K. Fenninger, K. Graf, R. Schneider, C. Hauser-Kronberger, F.H. Schilling, P. Kogner, M. Ratschek, N. Jones, W. Sperl, and B. Kofler, *J. Mol. Neurosci.*, **29**, 145 (2006). (*Original*)
R. Santic, S.M. Schmidhuber, R. Lang, I. Rauch, E. Voglas, N. Eberhard, J.W. Bauer, S.D. Brain, and B. Kofler, *Proc. Natl. Acad. Sci. U.S.A.*, **104**, 10217 (2007). (*Pharmacol.*)

Angiotensins

Ang II is part of the renin-angiotensin system which is responsible for the regulation of blood pressure and fluid balance. It is processed in a series of steps that begins with enzymatic activity of renin on angiotensinogen. Ang II produces many potent effects including vasoconstriction and release of aldosterone which increases reabsorption of electrolytes. Nagata *et al*. recently isolated a new angiotensinogen-derived peptide with an antibody that binds to the *N*-terminus of Ang II. The 12 amino acid peptide was named proangiotensin-12 (*PAN-4439-v*) and may be a precursor to Ang II.[1] It was detected in significant concentrations in a number of rat tissues and demonstrated to have constrictive effects, though its activity was not as potent as Ang II. Its discovery suggests an alternative processing method for Ang II that may be independent of renin.

1. S. Nagata, J. Kato, K. Sasaki, N. Minamino, T. Eto, and K. Kitamura, *Biochem. and Biophys. Res. Commun.*, **350**, 1026 (2006). *(Original; Primary Structure & Pharmacol.)*

Proangiotensin-12 (Rat)

PAN-4439-v -20 °C — 0.5 mg vial

DRVYIHPFHLLY

Asp-Arg-Val-Tyr-Ile-His-Pro-Phe-His-Leu-Leu-Tyr

(M.W. 1572.8) $C_{77}H_{109}N_{19}O_{17}$

New Member of Angiotensin Family

S. Nagata, J. Kato, K. Sasaki, N. Minamino, T. Eto, and K. Kitamura, *Biochem. and Biophys. Res. Commun.*, **350**, 1026 (2006). (*Original; Primary Structure & Pharmacol.*)
• This compound is distributed through Peptide Institute, Inc. under the license of University of Miyazaki.

Proangiotensin-12 (Rat) Antisera

NAN-14439-v -20 °C — 50 µL vial

Host: Rabbit

S. Nagata, J. Kato, K. Sasaki, N. Minamino, T. Eto, and K. Kitamura, *Biochem. Biophys. Res. Commun.*, **350**,1026 (2006).

H-Ala-Arg-Val-Tyr-Ile-His-Pro-Phe-OH

PAN-3921-PI -20 °C — 1 mg, 5 mg

Des-Asp^1-[Ala^1]-Angiotensin II (Human)

ARVYIHPF

(M.W. 1002.19) $C_{49}H_{71}N_{13}O_{10}$

Vasoconstrictive Peptide / Angiotensin Peptide

V. Jankowski, R. Vanholder, M. van der Giet, M. Tölle, S. Karadogan, J. Gobom, J. Furkert, A. Oksche, E. Krause, T.N.A. Tran, M. Tepel, M. Schuchardt, H. Schlüter, A. Wiedon, M. Beyermann, M. Bader, M. Todiras, W. Zidek, and J. Jankowski, *Arteriosclerosis, Thrombosis, and Vascular Biology,* **27**, 297 (2007).

PRODUCT	CODE	QTY
[Sar[1]]-Angiotensin II H-Sar-Arg-Val-Tyr-Ile-His-Pro-Phe-OH (M.W. 1002.19) $C_{49}H_{71}N_{13}O_{10}$ *Vasoconstrictive Peptide / Angiotensin Peptide* R.J. Kokje, W.L. Wilson, T.E. Brown, V.T. Karamyan, J.W. Wright, and R.C. Speth, *Hypertension*, **49**, 1328 (2007).	**PAN-3948-PI** -20 °C	1 mg 5 mg
[*N*-Me-Asp[1]]-Angiotensin II H-*N*-Me-Asp-Arg-Val-Tyr-Ile-His-Pro-Phe-OH (M.W. 1060.23) $C_{51}H_{73}N_{13}O_{12}$ *Vasoconstrictive Peptide / Angiotensin Peptide* R.J. Kokje, W.L. Wilson, T.E. Brown, V.T. Karamyan, J.W. Wright, and R.C. Speth, *Hypertension*, **49**, 1328 (2007).	**PAN-3949-PI** -20 °C	1 mg 5 mg

Arg-Gly-Asp "RGD" Peptides

The extracellular matrix (ECM) is central for cell recognition, adhesion and migration. ECM proteins have an arg-gly-asp (RGD) core that allows for receptor recognition. Synthetic peptides containing RGD can compete with ECM protein ligands for receptor binding. **GRGDNP** (*PCI-3909-PI*) binds to vitronectin and fibronectin receptors and block interaction to their perspective ligands, though it is a more active inhibitor of fibronectin receptor.[1] GRGDNP was found to induce caspase 3 mediated apoptosis in cells and block tumor invasion, implicating fibronectin and vitronectin in tumor metastasis.[2,3] In addition, these ECM proteins may influence cardiac function as well.[4,5] See below for other new RGD products. *http://pepnet.com/products/rgdpeptides.pdf*

1. M.D. Pierschbacher and E. Ruoslahti, *J. Biol. Chem.*, **262**, 17294 (1987).
2. C.D. Buckley, *et al.*, *Nature*, **397**, 534 (1999).
3. K.R. Gehlsen, *et al.*, *J. Cell Biol.*, **106**, 925 (1988).
4. V. Sarin, *et al.*, *J. Physiol.*, **564.2**, 603 (2005).
5. J.E. Mogford, *et al.*, *J. Clin. Invest.*, **100**, 1647 (1997).

Arg-Gly-Asp (RGD) for Cell Adhesion of Biomaterials

Integrins, such as fibronectin, are involved in mediating cell to cell interactions and cell to extracellular matrix interactions. They play a central roll in cell adhesion, chemotaxis, cell growth, tissue repair, and tumor development among others. A peptide containing the fibronectin active fragment or cell binding domain was first developed to increase cell attachment to biomaterial or plastic surfaces.[1] **Ac-GrGDSPASSKGGGGSrLLLLLLr-NH_2** also contains a hydrophobic region, SPASSK which acts as a spacer between the cell attachment and biomaterial domains for improved cell attachment to nonbiological surfaces. Additional leucine residues were incorporated to obtain saturated binding. D-arginines were introduced and the N- and C- termini were protected to prevent degradation by endoproteases and exopeptidases respectively.

Ac-GrGDSPASSKGGGGSrLLLLLLr-NH_2 has been used as a research application for studying mechanochemical transduction and contractile forces by coating the peptide to magnetic microbeads. This has allowed for the study of contractile forces of airway smooth muscle cells and their role with asthma and mechanical study of the elasticity of alveolar epithelial cells.[2,3] Besides its role in understanding cytoskeletal remodeling, the peptide has also been employed to block *C. albicans* adherence by binding to a fibronectin-like receptor on the yeast cells, reducing the number of pathogens *in vitro* and *in vivo*.[4] This peptide could also prove useful in cell attachment to nonbiological surfaces for tissue regeneration and implantation associated with therapeutic applications.

1. W.S. Craig, *et al.*, *Biopolymers Peptide Science*, **37**, 157 (1995).
2. S.S. An, *et al.*, *Am. J. Resp. Cell and Molec. Biol.*, **35**, **55** (2006).
3. X. Trepat, *et al.*, *Am. J. Physiol. Lung Cell Mol. Physiol.*, **287,** L1025 (2004).
4. S.A. Klotz, *et al.*, *Antimicrob. Agents and Chemother.*, **36,** 132 (1992)

.

PRODUCT	CODE	QTY
Ac-Gly-D-Arg-Gly-Asp-Ser-Pro-Ala-Ser-Ser-Lys-$(Gly)_4$-Ser-D-Arg-$(Leu)_6$-D-Arg-NH_2 **Ac-GrGDSPASSKGGGGSrLLLLLLr-Amide** (Trifluoroacetate Salt) (M.W. 2308.69) $C_{98}H_{174}N_{34}O_{30}$ *Hydrophobic Fibronectin Peptide* W.S. Craig, S. Cheng, D.G. Mullen, J. Blevitt, and M.D. Pierschbacher, *Biopolymers (Peptide Sci.)*, **37**, 157 (1995).	**PFA-3924-PI** -20 °C	1 mg 5 mg
***cyclo* (Arg-Ala-Asp-D-Phe-Cys)** **c(RADfC)** (M.W. 592.68) $C_{25}H_{36}N_8O_7S$ *Control for PCI-3686-PI*	**PCI-3960-PI** -20 °C	1 mg 5 mg 25 mg
***cyclo* (Arg-Ala-Asp-D-Phe-Lys(Ac-SCH_2CO))** **c(RADfK(Ac-SCH_2CO))** (M.W. 733.85) $C_{32}H_{47}N_9O_9S$ *Control for PCI-3699-PI*	**PCI-3959-PI** -20 °C	1 mg 5 mg 25 mg
***cyclo* [Arg-Ala-Asp-D-Phe-Lys(PEG-PEG)]** **c[RGDfK(PEG-PEG)]** (M.W. 908.03) $C_{40}H_{65}N_{11}O_{13}$ *Control Peptide for PCI-3696-PI*	**PCI-3954-PI** -20 °C	1 mg 5 mg 25 mg
***cyclo* (Arg-Ala-Asp-D-Tyr-Cys)** **c(RADyC)** (M.W. 608.68) $C_{25}H_{36}N_8O_8S$ *Control for PCI-3912-PI*	**PCI-3917-PI** -20 °C	1 mg 5 mg

PRODUCT	CODE	QTY
cyclo (Arg-Gly-Asp-D-Phe-Lys) **c(RGDfK)** (Trifluoroacetate Salt) (M.W. 603.68) $C_{27}H_{41}N_9O_7$ *RGD Tumor Targeting Peptide* (Requires further derivatization before use) M. Kantlehner, P. Schaffner, D. Finsinger, J. Meyer, A. Jonczyk, B. Diefenbach, B. Nies, G. Hozemann, S.L. Goodman, and H. Kessler, *Chembiochem.*, **1**, 107 (2000). R.J. Kok, A.J. Schraa, E.J. Bos, H.E. Moorlag, S.A. Ásgeirsdóttir, M. Everts, D.K. Meijer, and G. Molema, *Bioconjug. Chem.*, **13**, 128 (2002).	**PCI-3919-PI** -20 °C	1 mg 5 mg 25 mg
cyclo (Arg-Gly-Asp-D-Tyr-Cys) **c(RGDyC)** (M.W. 594.65) $C_{24}H_{34}N_8O_8S$ *Negative Control Available, see PCI-3917-PI*	**PCI-3912-PI** -20 °C	1 mg 5 mg
cyclo (Arg-Gly-Glu-D-Phe-Lys) **c(RGEfK)** (M.W. 617.71) $C_{28}H_{43}N_9O_7$	**PCI-3953-PI** -20 °C	1 mg 5 mg 25 mg
H-Arg-Ala-Asp-Ser-Lys-OH **RADSK** (M.W. 575.63) $C_{22}H_{41}N_9O_9$ *Negative Control for PLI-3929-PI*	**PCI-3930-PI** -20 °C	1 mg 5 mg
H-Arg-Gly-Asp-Ser-Lys-OH **RGDSK** (M.W. 561.60) $C_{21}H_{39}N_9O_9$ *RGD Tumor Targeting Peptide* *Negative Control Available, see PCI-3930-PI* S. Jasseron, C. Contino-Pepin, J.C. Maurizis, M. Rapp, B. Pucci, *Bioorganic & Medicinal Chemistry Letters,* **12,** 7, (2002). S. Jasseron, C. Contino-Pepin, J.C. Maurizis, M. Rapp, B. Pucci, *Eur J Med Chem,* **38**, 9, (2003).	**PCI-3929-PI** -20 °C	1 mg 5 mg
Galactosyl-cyclo (Arg-Gly-Asp-D-Phe-Lys) **C(-RDGFK(SAA)** (M.W. 792.85) $C_{34}H_{52}N_{10}O_{12}$ [922175-70-0] *Glycosylated RGD for radiolabelling* Habner, *et al.*, *Bioconjugate Chem.*, **15**, 1, (2004).	**RGD-3736-PI** -20 °C	1 mg 5 mg
H-Gly-Arg-Ala-Asp-Ser-Pro-OH **GRADSP** (M.W. 601.62) $C_{23}H_{39}N_9O_{10}$ *Negative Control for Fibronectin Inhibitors* D.G. Hoyt, J.M. Rusnak, R.J. Mannix, R.A. Modzelewski, C.S. Johnson, and J.S. Lazo, *Cancer Res.*, **56**, 4146 (1996).	**PCI-3910-PI** -20 °C	1 mg 5 mg
H-Gly-Arg-Gly-Asp-Asn-Pro-OH **GRGDNP** (M.W. 614.62) $C_{23}H_{38}N_{10}O_{10}$ *Inhibitor of Cell Adhesion to Fibronectin* M.D. Pierschbacher and E. Ruoslahti, *J. Biol. Chem.*, **262**, 17294 (1987).	**PCI-3909-PI** -20 °C	5 mg 25 mg
H-Gly-Arg-Gly-Glu-Ser-OH **GRGES** (M.W. 504.50) $C_{18}H_{32}N_8O_9$ *Negative Control for PFA-4189-v* C.D. Buckley, D. Pilling, N.V. Henriquez, G. Parsonage, K. Threlfall, D. S-Toellner, D.L. Simmons, A.N. Akbar, J.M. Lord, and M. Salmon, *Nature*, **397**, 534 (1999)	**PFA-3907-PI** -20 °C	5 mg 25 mg
H-Gly-Gly-Gly-Gly-Arg-Gly-Asp-Ser-Pro-OH **GGGGRGDSP** (M.W. 758.75) $C_{28}H_{46}N_{12}O_{13}$ *Fibronectin Binding Domain*	**PCI-3965-PI** -20 °C	5 mg 25 mg

PRODUCT	CODE	QTY

C Peptide

C-Peptide (Human)

PCP-3725-PI — -20 °C — 1 mg

(Acetate Salt)
H-Glu-Ala-Glu-Asp-Leu-Gln-Val-Gly-Gln-Val-Glu-Leu-Gly-Gly-Gly-Pro-
Gly-Ala-Gly-Ser-Leu-Gln-Pro-Leu-Ala-Leu-Glu-Gly-Ser-Leu-Gln-OH
(M.W. 3020.28) $C_{129}H_{211}N_{35}O_{48}$ [33017-11-7]
Insulin Precursor (57-87) (Human)

A.S.C. Ko and D.G.Smyth, *Eur. J. Biochem.*, **20**, 190 (1971).
P.E. Oyer, *et al.*, *J. Biol. Chem.*, **246**, 1375 (1971).
K. Igano, *et al.*, *Bull. Chem. Soc. Jpn.*, **54**, 3088 (1981).
J. Wahren, *et al.*, *Exp. Diabesity Res.*, **5**, 15 (2004).
J.P. Palmer, *et al.*, *Diabetes*, **53**, 250 (2004).

[Tyr0]-C-Peptide (Human)

[Tyr0]-C-Peptide (Human)

PCP-3724-PI — -20 °C — 1 mg, 5 mg

(Acetate Salt)
H-Tyr-Glu-Ala-Glu-Asp-Leu-Gln-Val-Gly-Gln-Val-Glu-Leu-Gly-Gly-Gly-Pro-
Gly-Ala-Gly-Ser-Leu-Gln-Pro-Leu-Ala-Leu-Glu-Gly-Ser-Leu-Gln-OH
(M.W. 3183.50) $C_{138}H_{220}N_{36}O_{50}$ [57327-90-9]
C-Peptide Derivative for Radioimmunoassay

V.K. Naithani, *et al.*, *Hoppe Seylers Z. Physiol. Chem.*, **356**, 1305 (1975).
N. Yanaihara, *et al.*, *Hoppe Seylers Z. Physiol. Chem.*, **362**, 775 (1981).
H. Sun, *et al.*, *Appl. Biochem. Biotechnol.*, **55**, 167 (1995).
V.K. Naithani, *et al.*, *Hoppe Seylers Z. Physiol. Chem.*, **356**, 1305 (1975).

Defensin Peptides

α-Defensin -2

The α-defensins, HNP 1, 2 and 3, are stored in the azurophilic granules of human neutrophils.[1,2] These agents are released into phagolysosomes containing ingested microbes where they bind and permeabilize the lipid bilayer of microbes. A previous study suggests α-defensins may also be involved in the pathogenesis of renal tumors. However, in more recent studies, HNP 1-3 was overexpressed in carcinoma cells and gingival fluid from dental patients indicating a role in host defense.[3-5] In addition, α-defensins can bind surface receptors involved in HIV-1 cell entry, neutralize anthrax toxin, and block infection of a nonenvelop virus.[6-8] This and additional evidence suggests α-defensins can interfere with infection by a method other than membrane binding. Peptides International now offers **α-defensin-2 (HNP-2)** (*PDF-4428-s*) to complete our line of α-defensin products. *http://pepnet.com/products/defensins1.pdf*

1. Ganz, *et al.*, *J. Clin. Invest.*, **76**, 1427 (1985).
2. Selsted, *et al.*, *J. Clin. Invest.*, **76**, 1436 (1985).
3. Muller, *et al.*, *Am. J. Pathol.*, **160**, 1311 (2002).
4. Lundy, *et al.*, *Oral Oncol.*, **40**, 139 (2004).
5. C. Kim, N. Gajendran, H.-W. Mittrüker, M. Weiwad, Y-H. Song, R. Hurwitz, M. Wilmanns, G. Fischer, and S.H.E. Kaufmann, *Proc. Natl. Acad. Sci., U.S.A.*, **102**, 4830 (2005).
6. C.B. Buck, P.M. Day, C.D. Thompson, J. Lubkowski, W. Lu, D.R. Lowy, and J.T. Schiller, *Proc. Natl. Acad. Sci., U.S.A.*, **103**, 1516 (2006).

α-Defensin-2 (Human)

HNP-2 (Human Neutrophil Peptide-2)

PDF-4428-s — -20 °C — 0.1 mg vial

Cys-Tyr-Cys-Arg-Ile-Pro-Ala-Cys-Ile-Ala-Gly-Glu-Arg-Arg-Tyr-Gly-
Thr-Cys-Ile-Tyr-Gln-Gly-Arg-Leu-Trp-Ala-Phe-Cys-Cys
Disulfide bond between Cys^{1}-Cys^{29}, Cys^{3}-Cys^{18}, and Cys^{8}-Cys^{28}
(M.W. 3371.0) $C_{147}H_{217}N_{43}O_{37}S_6$
Antimicrobial Peptide

α- Defensin-4 (Human)

HNP-4 (Human Neutrophil Peptide-4)

PDF-4431-s — -20 °C — 0.1 mg vial

Val-Cys-Ser-Cys-Arg-Leu-Val-Phe-Cys-Arg-Arg-Thr-Glu-Leu-Arg-Val-Gly-Asn-Cys-Leu-Ile-Gly-Gly-Val-Ser-Phe-Thr-Tyr-Cys-Cys-Thr-Arg-Val
(Disulfide bonds between Cys^{2}-Cys^{30}, Cys^{4}-Cys^{19}, and Cys^{9}-Cys^{29})
(M.W. 3709.40) $C_{157}H_{255}N_{49}O_{43}S_6$
Antimicrobial Peptide

A. Singh, A. Bateman, Q. Zhu, S. Shimasaki, F. Esch, and S. Solomon, *Biochem. Biophys. Res. Commun.*,**155**, 524 (1988). (*Original; Primary Structure/Anti-ACTH Activity*)
C.G. Wilde, J.E. Griffith, M.N. Marra, J.L. Snable, and R.W. Scott, *J. Biol. Chem.*, **264**, 11200 (1989). (*Original; Structure/HNP-4/Antimicrobial Activity*)
Z. Wu, B. Ericksen, K. Tucker, J. Lubkowski, and W. Lu, *J. Pept. Res.*, **64**, 118 (2004). (*Pharmacol; Antimicrobial Activity*)

PRODUCT	CODE	QTY

α- Defensin-6 (Human)

PDF-4458-s -20 °C — 0.1 mg vial

[HD-6 (Human Defensin-6)]
Ala-Phe-Thr-Cys-His-Cys-Arg-Arg-Ser-Cys-Tyr-Ser-Thr-Glu-Tyr-Ser-Tyr-Gly-Thr-Cys-Thr-Val-Met-Gly-Ile-Asn-His-Arg-Phe-Cys-Cys-Leu
(Disulfide bonds between Cys^{4}-Cys^{31}, Cys^{6}-Cys^{20}, and Cys^{10}-Cys^{30})
(M.W. 3708.20) $C_{156}H_{228}N_{46}O_{46}S_7$
Synthetic Product
Antimicrobial Peptide in Paneth Cells

D.E. Jones and C.L. Bevins, *FEBS Lett.*, **315**,187 (1993). (*Original; mRNA Seq.*)
E.M. Porter, M.A. Poles, J.S. Lee, J. Naitoh, C.L. Bevins, and T. Ganz, *FEBS Lett.*, **434**, 272 (1998). (*Endogenous Form*)
E. Hazrati, B. Galen, W. Lu, W. Wang, Y. Ouyang, M.J. Keller, R.I. Lehrer, and B.C. Herold, *J. Immunol.*, **177**, 8658 (2006). (*Pharmacol.; Inhibition of Herpes Simplex Virus Infection*)
M. Doss, M.R. White, T. Tecle, D. Gantz, E.C. Crouch, G. Jung, P. Ruchala, A.J. Waring, R.I. Lehrer, and K.L. Hartshorn,
J. Immunol., **182**, 7878 (2009). (*Pharmacol.; Influenza A Virus Neutralizing Activity*)
M.E. Klotman, A. Rapista, N. Teleshova, A. Micsenyi, G.A. Jarvis, W. Lu, E. Porter, and T.L. Chang,
J. Immunol., **180**, 6176 (2008). (*Pharmacol.; Enhancement of HIV Infectivity*)

DCD-1L

DCD-1L (Human)

PDL-4454-s -20 °C — 0.1 mg vial

Ser-Ser-Leu-Leu-Glu-Lys-Gly-Leu-Asp-Gly-Ala-Lys-Lys-Ala-Val-Gly-Gly-Leu-Gly-Lys-Leu-Gly-Lys-Asp-
Ala-Val-Glu-Asp-Leu-Glu-Ser-Val-Gly-Lys-Gly-Ala-Val-His-Asp-Val-Lys-Asp-Val-Leu-Asp-Ser-Val-Leu
(M.W. 4818.40) $C_{210}H_{359}N_{57}O_{71}$
Synthetic Product
Antimicrobial Peptide in Sweat Glands

B. Schittek, R. Hipfel, B. Sauer, J. Bauer, H. Kalbacher, S. Stevanovic, M. Schirle, K. Schroeder, N. Blin, F. Meier, G. Rassner, and C. Garbe,
Nat. Immunol., **2**, 1133 (2001). (*Original; Antimicrobial Peptide*)
S. Rieg, H. Steffen, S. Seeber, A. Humeny, H. Kalbacher, K. Dietz, C. Garbe, and B. Schittek, *J. Immunol.*, **174**, 8003 (2005).(*Endogenous Form*)
H. Steffen, S.Rieg, I. Wiedemann, H. Kalbacher, M. Deeg, H.-G. Sahl, A. Peschel, F. Götz, C. Garbe, and B. Schittek, *Antimicrob. Agents Chemother.*, **50**, 2608 (2006). (*Pharmacol.*)
F. Niyonsaba, A. Suzuki, H. Ushio, I. Nagaoka, H. Ogawa, and K. Okumura,Br. J. Dermatol.,160,243 (2009).(Pharmacol.)
I. Senyurek, M. Paulmann, T. Sinnberg, H. Kalbacher, M. Deeg, T. Gutsmann, M. Hermes, T. Kohler, F. Götz, C. Wolz, A. Peschel, and B. Schittek,
Antimicrob. Agents Chemother., **53**, 2499 (2009).(*Pharmacol.*)

[Glu^{1}]- Fibrinopeptide B

[Glu^{1}]-Fibrinopeptide B

PFB-3742-PI -20 °C — 1 mg, 5 mg

(Trifluoroacetate Salt)
H-Glu-Gly-Val-Asn-Asp-Asn-Glu-Glu-Gly-Phe-Phe-Ser-Ala-Arg-OH
(M.W. 1570.60) $C_{66}H_{95}N_{19}O_{26}$ [103213-49-6]
Mass Spec Standard for Proteomic Research

C. Fu, *et al., BioFiles 2006*, **1.5**, 2 (2009).

Glucagon-like Peptides

Glucagon-like Peptide 1 (Human, 7-36)-Lys(Biotinyl)-Amide

GLP-1 (7-36)-Lys(Biotin)-amide

PGL-3723-PI -20 °C — 1 mg, 5 mg

(Acetate Salt)
H-His-Ala-Glu-Gly-Thr-Phe-Thr-Ser-Asp-Val-Ser-Ser-Tyr-Leu-Glu-Gly-Gln-Ala-Ala-Lys-Glu-Phe-Ile-Ala-Trp-Leu-Val-Lys-Gly-Arg-Lys(biotinyl)-NH_2
(M.W. 3652.18) $C_{165}H_{252}N_{44}O_{48}S$
Stimulates Glucose-Dependent Insulin Secretion / Inhibitor of Glucagon Secretion

H. John, *et al., Eur J Med Res.*, **13**, 73 (2008).
B. Ahrén, *et al., Diabetes Care*, **25**, 869 (2002).
C.F. Deacon, *et al., Am. J. Physiol. Endocrinol. Metab.*, **282**, E873 (2002).
B. Rolin, *et al., Eur. J. Pharmacol.*, **494**, 283 (2004).
D. Elahi, *et al., Obesity*, **16**, 1501 (2008).

Glucagon-like Peptide 1 (Human, 9-36 Amide)

GLP-1 (Human, 9-36 amide)

PGL-3722-PI -20 °C — 1 mg, 5 mg

(Acetate Salt)
H-Glu-Gly-Thr-Phe-Thr-Ser-Asp-Val-Ser-Ser-Tyr-Leu-Glu-Gly-Gln-Ala-Ala-Lys-Glu-Phe-Ile-Ala-Trp-Leu-Val-Lys-Gly-Arg-NH_2
(M.W. 3089.48) $C_{140}H_{214}N_{36}O_{43}$ [161748-29-4]
Inhibitor of Glucagon Secretion and Gastric Emptying

H. John, *et al., Eur. J Med Res.*, **13**, 73 (2008).
B. Ahrén, *et al.*, Diabetes Care, **25**, 869 (2002).
C.F. Deacon, *et al., Am. J. Physiol. Endocrinol. Metab.*, **282**, E873 (2002).
B.Rolin, *et al., Eur. J. Pharmacol.*, **494**, 283 (2004).
D.Elahi, *et al., Obesity*, **16**, 1501 (2008)
E. Tomas, *et al., Diabetes Obes. Metab*, **13**, 26 (2011).
J. Meier, *et al., Am. J. Physiol. Endocrinol Metab*, **290**, E1118 (2006).

Growth Hormone Related Peptides

Growth hormone releasing peptide-2 or **H-D-Ala-D-Nal(2')-Ala-Trp-D-Phe-Lys-NH_2** (GHRP-2) (*PGH-3911-PI*) is part of the growth hormone secretagogue (GHS) family first identified nearly 20 years ago. Ghrelin was later isolated and like GHRPs, were found to stimulate release of growth hormone.[1,2] Ghrelin and GHRPs act on growth hormone secretagogue receptor type 1a (GSR1a) in a synergistic manner, and both can stimulate increase of food intake in humans.[3-6] Besides its role in energy balance, GHRP-2 has been implicated to have anti inflammatory effects in arthritic rats due to its ability to decrease IL-6 in serum, a major mediator of tissue destruction in this disease.[7] Cardio protective functions have been observed as well.[8]

GSR1a was found to exhibit high basal activity independent of ghrelin activation.[9] Constitutive, ligand independent activation of GSR1a is physiologically important, and inverse agonists would be helpful in studies focused on such activity. [D-Arg[1],D-Phe[5],D-Trp[7,9],Leu[11]]-substance P (*PGH-3652-PI*) is a selective inverse agonist for GSR1a with low antagonist activity.[10] The pentapeptide core required for inverse agonist activity was determined to be wFwLL.[11] Addition of a positive charged amino acid led to a novel peptide **KwFwLL** (*PGH-3908-PI*); the most potent and shortest inverse agonist for GSR1a. http://pepnet.com/products/ghrelin_obestatin.pdf

1. Arvat, *et al.*, *J. Clin. Endocrinol. Metab.*, **86**,1169 (2001).
2. F. Broglio, *et al., J. Clin. Endocrinol. Metab.*, **88**, 1537 (2003).
3. Cunha *et al.*, *Endocrinology*, **83**, 1186 (2002).
4. Hataya, *et al., J. Clin. Endocrinol. Metab.*, **86**, 4552 (2001).
5. Wren, *et al., J. Clin. Endocrinol. Metab.*, **89**, 2832 (2001).
6. Laferrere, *et al., J. Clin. Endocrinol. Metab.*, **90**, 611 (2005).
7. Granando, *et al., Am. J.Physiol. Endocrinol. Metab.*, **288**, E486 (2005).
8. Weekers, *et al., Endocinol.*, **141**, 3993 (2000).
9. Asakawa, *et al., Gastroenterology*, **120**, 337 (2001).
10. Pantel, *et al., J. Clin. Investig.*, **116**, 760 (2006).
11. Holst, *et al., Mol. Pharmacol.*, **70**, 936 (2006).

H-D-Ala-D-Nal(2')-Ala-Trp-D-Phe-Lys-NH

GHRP-2 — PGH-3911-PI — -20 °C — 1 mg, 5 mg

(M.W. 818) $C_{45}H_{55}N_9O_6$

Growth Hormone Releasing Peptide / Food Intake Stimulator

H-Gly-Asp-Gly-Val-D-Ile-Thr-Arg-Ile-Arg-OH

GDGViTRIR — PCI-3964-PI — -20 °C — 1 mg, 5 mg

(M.W.986.15) $C_{41}H_{75}N_{15}O_{13}$

CD36 Binding Peptide; Thrombospondin-1 (TSP1) Receptor Binding Peptide

J.S. Isenberg, Y. Jia, J. Fukuyama, C.H. Switzer, D.A. Wink, and D.D. Roberts, *J. Biol. Chem.*, **282**, 15404 (2007).

H-Lys-D-Trp-Phe-D-Trp-Leu-Leu-NH_2

KwFwLL — PGH-3908-PI — -20 °C — 1 mg, 5 mg

(M.W. 891.14) $C_{49}H_{66}N_{10}O_6$

Potent Full Inverse Agonist for Ghrelin Receptor

PRODUCT	CODE	QTY

Hepcidin

Hepcidin is an antimicrobial peptide and negative regulator of iron homeostasis.[1] Both iron loading and inflammation can stimulate hepcidin production in the liver.[2,3] Humans have one copy of the hepcidin gene while mice contain 2 copies; hepcidin 1 and 2. Overexpression of hepcidin 1 but not 2 in mice led to anemia, suggesting the former is the predominant regulator of iron metabolism.[4] In addition, disruption of hepcidin 1 in mice caused severe multivisceral iron overload and hemochromatosis.[5] **Hepcidin 1 (mouse)** (*PLP-4434-s*), is now available for investigation of iron-related diseases.

1. C.H. Park, E.V. Valore, A.J. Waring, and T. Ganz, *J. Biol. Chem.*, **276**, 7806 (2001).
2. C. Pigeon, G. Ilyin, B. Courselaud, P. Leroyer, B. Turlin, P. Brissot, and O. Loreal, *J. Biol. Chem.*, **276**, 7811 (2001).
3. G. Nicholas, C. Chauvet, L. Viatte, J.L. Danan, X. Bigard, I. Devauxd, C. Beaumont, A. Kahn, and S. Vaulont, *J. Clin. Invest.*, **110**, 1037 (2002).
4. D.-Q. Lou, G. Nicholas, J.-C. Lesbordes, L. Viatte, G. Grimber, M-F. Szajnert, A. Kahn, and S. Vaulont, *Blood*, **103**, 2816 (2004).
5. J.-C. Lesbordes-Brion, L. Viatte, M. Bennoun, D.-Q. Lou, G. Ramey, C. Houbron, G. Hamard, A. Kahn, and S. Vaulont, *Blood*, **108**, 1402 (2006).

Hepcidin 1 (Mouse) — PLP-4434-s — 0.1 mg vial

Liver-Expressed Antimicrobial Peptide 1 (Mouse)

-20 °C

Asp-Thr-Asn-Phe-Pro-Ile-Cys-Ile-Phe-Cys-Cys-Lys-Cys-Cys-Asn-Asn-Ser-Gln-Cys-Gly-Ile-Cys-Cys-Lys-Thr
(Disulfide bonds undetermined)
(M.W. 2754.2) $C_{111}H_{169}N_{31}O_{35}S_8$
Iron-Regulatory Hormone

Important Information: *In order to avoid confusion caused by the two components of LEAP peptides and by the previous product name, the Peptide Institute has changed the names for PLP-4392-s and PLP-4405-s.*

Product Code	New product name	Previous product name
PLP-4392-s	Hepcidin / LEAP-1 (Human)	Liver-Expressed Antimicrobial Peptide 1 (Human)
PLP-4405-s	LEAP-2 (Human)	Liver-Expressed Atimicrobial Peptide 2 (Human)

Hepcidin/LEAP-1 (Human) contains 8 Cys residues, disulfide connectivity of which was first determined to be Cys^7-Cys^{23}, Cys^{10}-Cys^{22}, Cys^{11}-Cys^{19}, and Cys^{13}-Cys^{14} based on the results from NMR analysis of the synthetic peptide. Recently, this connectivity has been revised to be Cys^7-Cys^{23}, Cys^{10}-Cys^{13}, Cys^{11}-Cys^{19}, and Cys^{14}-Cys^{22} using the natural peptide from urine, two recombinant peptides expressed in CHO cells or *E. coli*, and the chemically synthesized peptide.[5] Methods applied to determine this newly reported connectivity include: NMR, X-ray crystallography of the anti-hepcidin/LEAP-1 antibody Fab complex, and disulfide mapping by partial reduction/alkylation procedure. Based on these experimental facts, we have now changed the disulfide connectivity of our hepcidin/LEAP-1 (Human) to the newly reported one, that is, (Reported disulfide bonds between Cys^7-Cys^{23}, Cys^{10}-Cys^{13}, Cys^{11}-Cys^{19}, and Cys^{14}-Cys^{22}).

1. A. Krause, S. Neitz, H.-J. Mägert, A. Schulz, W.-G. Forssmann, P. Schulz-Knappe, and K. Adermann, *FEBS Lett.*, **480**, 147 (2000). *(Original; LEAP-1)*
2. C.H. Park, E.V. Valore, A.J. Waring, and T. Ganz, *J. Biol. Chem.*, **276**, 7806 (2001). *(Original; Hepcidin)*
3. T. Ganz and E. Nemeth, *Am. J. Physiol.*, **290**, G199 (2006). (*Review*)
4. H.N. Hunter, D.B. Fulton, T. Ganz, and H.J. Vogel, *J. Biol. Chem.*, **277**, 37597 (2002). *(Previously published S-S Bond Connectivity)*
5. J.B. Jordan, L. Poppe, M. Haniu, T. Arvedson, R. Syed, V. Li, H. Kohno, H. Kim, P.D. Schnier, T.S. Harvey, L.P. Miranda, J. Cheetham, and B.J. Sasu, *J. Biol. Chem.*, **284**, 24155 (2009). *(Newly published S-S Bond Connectivity)*

Hepcidin / LEAP-1 (Human) (0.1 mg vial) — PLP-4392-s — 0.1 mg vial

-20 °C

Asp-Thr-His-Phe-Pro-Ile-Cys-Ile-Phe-Cys-Cys-Gly-Cys-Cys-His-Arg-Ser-Lys-Cys-Gly-Met-Cys-Cys-Lys-Thr
(Disulfide bonds between Cys^7-Cys^{23}, Cys^{10}-Cys^{13}, Cys^{11}-Cys^{19}, and Cys^{14}-Cys^{22}) ← **New Connectivity Reported!**
(M.W. 2789.4) $C_{113}H_{170}N_{34}O_{31}S_9$
Liver-Expressed Antimicrobial Peptide / Iron-Regulatory Hormone

PRODUCT	CODE	QTY

Kisspeptin Peptides

Kisspeptin-10 (Rat) / Metastin (Rat, 43-52)

Kp-10 (Rat) / KiSS-1 Gene Product (Rat, 110-119 Amide)

PKS-4453-v · -20 °C · 0.5 mg vial

YNWNSFGLRY-NH_2
Tyr-Asn-Trp-Asn-Ser-Phe-Gly-Leu-Arg-Tyr-NH_2
(M.W. 1318.4) $C_{63}H_{83}N_{17}O_{15}$
Ligand for hOT7T175 / GPR54

T. Ohtaki, Y. Shintani, S. Honda, H. Matsumoto, A. Hori, K. Kanehashi, Y. Terao, S. Kumano, Y. Takatsu, Y. Masuda, Y. Ishibashi, T. Watanabe, M. Asada, T. Yamada, M. Suenaga, C. Kitada, S. Usuki, T. Kurokawa, H. Onda, O. Nishimura, and M. Fujino, *Nature*, **411**, 613 (2001). (*Metastin*)
M. Kotani, M. Detheux, A. Vandenbogaerde, D. Communi, J.-M. Vanderwinden, E. Le Poul, S. Brezillon, R. Tyldesley, N. Suarez-Huerta, F. Vandeput, C. Blanpain, S.N. Schiffmann, G. Vassart, and M. Parmentier, *J. Biol. Chem.*, **276**, 34631 (2001). (*Kisspeptin*)
Y. Terao, S. Kumano, Y. Takatsu,M. Hattori, A. Nishimura, T. Ohtaki, and Y. Shintani, *Biochim. Biophys. Acta*, **1678**, 102 (2004). (*Original; Rat Metastin*)
V. Pheng, Y. Uenoyama, T. Homma, Y. Inamoto, K. Takase, K. Yoshizawa-Kumagaye, S. Isaka, T.X. Watanabe, S. Ohkura, J. Tomikawa, K.-i. Maeda, and H. Tsukamura, *J. Reprod. Dev.*, **55**, 378 (2009). (*Pharmacol.*)
M.L. Gottsch, D.K. Clifton, and R.A. Steiner, *Peptides*, **30**, 4 (2009). (*Review*)

Note: *Based on nomenclature recommendations, we hereafter use the product name of "Kisspeptin / Metastin" for peptides derived from KiSS-1 gene, including Code PMT-4389-v (see below).*

Kisspeptin-10 (Human) / Metastin (Human, 45-54)

PMT-4389-v · -20 °C · 0.5 mg vial

Former Name Metastin (Human, 45-54)
Kp-10 (Human) / KiSS-1 Gene Product (Human, 112-121 Amide)
YNWNSFGLRF-NH_2
Tyr-Asn-Trp-Asn-Ser-Phe-Gly-Leu-Arg-Phe-NH_2
(M.W. 1302.4) $C_{63}H_{83}N_{17}O_{14}$
Ligand for hOT7T175 / GPR54

Kisspeptin-54 (Human) / Metastin (Human, 1-54)

[Kp-54 (Human) / KiSS-1 Gene Product (Human, 68-121 Amide)]

PMT-4446-v · -20 °C · 0.5 mg vial

Gly-Thr-Ser-Leu-Ser-Pro-Pro-Pro-Glu-Ser-Ser-Gly-Ser-Arg-Gln-Gln-Pro-Gly-Leu-Ser-Ala-Pro-His-Ser-Arg-Gln-Ile-Pro-Ala-Pro-Gln-Gly-Ala-Val-Leu-Val-Gln-Arg-Glu-Lys-Asp-Leu-Pro-Asn-Tyr-Asn-Trp-Asn-Ser-Phe-Gly-Leu-Arg-Phe-NH_2
(M.W. 5857.40) $C_{258}H_{401}N_{79}O_{78}$
Synthetic Product
Stimulator of Hypothalamic-Pituitary Gonadal Axis

T. Ohtaki, Y. Shintani, S. Honda, H. Matsumoto, A. Hori, K. Kanehashi, Y. Terao, S. Kumano, Y. Takatsu, Y. Masuda, Y. Ishibashi, T. Watanabe, M. Asada, T. Yamada, M. Suenaga, C. Kitada, S. Usuki, T. Kurokawa, H. Onda, O. Nishimura, and M. Fujino, *Nature*, **411**, 613 (2001). (*Original; Metastin*)
A.I. Muir, L. Chamberlain, N.A. Elshourbagy, D. Michalovich, D.J. Moore, A. Calamari, P.G. Szekeres, H.M. Sarau, J.K. Chambers, P. Murdock, K. Steplewski, U. Shabon, J.E. Miller, S.E. Middleton, J.G. Darker, C.G.C. Larminie, S. Wilson, D.J. Bergsma,, *J. Biol. Chem.*, **276**, 28969 (2001). (*Original; Kisspeptin*)
M. Kinoshita, H. Tsukamura, S. Adachi, H. Matsui, Y. Uenoyama, K. Iwata, S. Yamada, K. Inoue, T. Ohtaki, H. Matsumoto, and K.-I. Maeda, *Endocrinology*, **146**,4431 (2005).(*Pharmacol.*)
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W.S. Dhillo, O.B. Chaudhri, M. Patterson, E.L. Thompson, K.G. Murphy, M.K. Badman, B.M. McGowan, V. Amber, S. Patel, M.A. Ghatei, and S.R. Bloom, *J. Clin. Endocrinol. Metab.*, **90**,6609 (2005).(*Phalmacol.*)

Kisspeptin-52 (Human) / Metastin (Human, 1-52)

[Kp-52 (Rat)/KiSS-1 Gene Product (Rat, 68-119 Amide)]

PMT-4447-v · -20 °C · 0.5 mg vial

Thr-Ser-Pro-Cys-Pro-Pro-Val-Glu-Asn-Pro-Thr-Gly-His-Gln-Arg-Pro-Pro-Cys-Ala-Thr-Arg-Ser-Arg-Leu-Ile-Pro-Ala-Pro-Arg-Gly-Ser-Val-Leu-Val-Gln-Arg-Glu-Lys-Asp-Met-Ser-Ala-Tyr-Asn-Trp-Asn-Ser-Phe-Gly-Leu-Arg-Tyr-NH_2
(Disulfide bond between Cys^4-Cys^{18})
(M.W. 5836.60) $C_{254}H_{398}N_{80}O_{73}S_3$
Synthetic Product
Stimulator of Hypothalamic-Pituitary Gonadal Axis

Y. Terao, S. Kumano, Y. Takatsu, M. Hattori, A. Nishimura, T. Ohtaki, and Y. Shintani, *Biochim. Biophys. Acta*,, **1678**,102 (2004). (*Original; Rat Metastin*)

Peptide 234

PPT-4460-v · -20 °C · 0.5 mg vial

Ac-D-Ala-Asn-Trp-Asn-Gly-Phe-Gly-D-Trp-Arg-Phe-NH_2
(M.W. 1295.40) $C_{63}H_{78}N_{18}O_{13}$
Synthetic Product
Synthetic Kisspeptin Antagonist

A.K. Roseweir, A.S. Kauffman, J.T. Smith, K.A. Guerriero, K. Morgan, J. Pielecka-Fortuna, R. Pineda, M.L. Gottsch, M. Tena-Sempere, S.M. Moenter, E. Terasawa, I.J. Clarke, R.A. Steiner, and R.P. Millar, *J. Neurosci.*, **29**, 3920 (2009). (*Pharmacol.*)
X.-F. Li, J.S. Kinsey-Jones, Y. Cheng, A.M.I. Knox, Y. Lin, N.A. Petrou, A. Roseweir, S.L. Lightman, S.R. Milligan, R.P. Millar, and K.T. O'Byrne, *PLoS One.*, **4**, e8334 (2009). (*Pharmacol.*)

PRODUCT	CODE	QTY

LL-37

LL-37 (Human)

PLL-4445-s — -20 °C — 0.1 mg vial

Leu-Leu-Gly-Asp-Phe-Phe-Arg-Lys-Ser-Lys-Glu-Lys-Ile-Gly-Lys-Glu-Phe-Lys-Arg-Ile-Val-Gln-Arg-Ile-Lys-Asp-Phe-Leu-Arg-Asn-Leu-Val-Pro-Arg-Thr-Glu-Ser

LLGDFFRKSKEKIGKEFKRIVQRIKDFLRNLVPRTES

(M.W. 4493.30) $C_{205}H_{340}N_{60}O_{53}$

Cathelicidin Antimicrobial Peptide

G.H. Gudmundsson, B. Agerberth, J. Odeberg, T. Bergman, B. Olsson, and R. Salcedo, *Eur. J. Biochem.*, **238**, 325 (1996). (*Original*)
R. Bals and J.M. Wilson, *Cell. Mol. Life Sci.*, **60**, 711 (2003). (*Review*)
M. Zanetti, *J. Leukoc. Biol.*, **75**, 39 (2004). (*Review*)
R. Lande, J. Gregorio, V. Facchinetti, B. Chatterjee, Y.-H. Wang, B. Homey, W. Cao, Y.-H. Wang, B. Su, F.O. Nestle, T. Zal, I. Mellman, J.-M. Schröder, Y.-J. Liu, and M. Gilliet, *Nature*, **449**, 564 (2007). (*Pharmacol.*)

MHC-class I-restricted epitope in hgp100

Cytotoxic T cells or CD8+ T cells play an important role in the immune defense and destruction of tumor and infected cells. They are capable of recognizing antigen (Ag) associated with major histo compatibility complex (MHC) class I molecules on these target cells. Following Ag stimulation, T cells are selected to undergo clonal selection and proliferation in the thymus if they have low autoreactivity to self antigens, leading to an appropriate immune response. Recognition of tumor antigens by T cells has prompted interest and research in antigen-based cancer vaccines. Progress was initially hampered by the lack of responsiveness to tumor antigens in clinical trials by T cells, probably because these Ags are expressed on normal as well as tumor cells; therefore the level of autoreactivity is too high to lead to clonal selection of specific T cells.

One of these candidate Ags is gp100; an antigen expressed on normal melanocytes as well as malignant melanomas. Later studies observed that xenogeneic immunization of mice with human gp100 (hgp100) could activate gp100 specific T cells, while mouse gp100 (mgp100) could not.[1] In addition, *in vivo* studies found that reactive gp100 specific T cells followed by recombinant IL-2 treatment dramatically reduced pulmonary metastases.[1] Further investigation determined Db to be the MHC class I molecule restricting gp100 recognition and its epitope to be hgp100 (25-33).[1] The peptide epitope hgp100 (25-33) was observed to have stronger binding affinity to Db than mgp100 (25-33) and could be used to activate T cells for adoptive therapy in the syngeneic mouse melanoma model.[1,2] The peptide epitope can be referred to as a heteroclitic epitope or an altered peptide that is more efficient at inducing T cell activation. Immunization of mice with a minigene encoding the heteroclitic epitope produced specific T cells that protected mice challenged with B16 melanoma, just as effectively as mice immunized with full length hgp100 DNA. Peptides International now offers human gp100 (25-33) for research involving this tumor Ag.

1. W.W. Overwijk, A. Tsung, K.R. Irvine, M.R. FParkhust, T.J. Goletz, K. Tsung, M.W. Carroll, C. Liu, B. Moss, S.A. Rosenber, and N.P. Restifo, *J. Exper. Med.*, **188**, 277 (1998).
2. J.S. Gold, C.R. Ferrone, Jj.A. G.-Patino, W.G. Hawkins, R. Dyall, M.E. Engelhorn, J.D. Wolchok, J.J. Lewis, and A.N. Houghton, *J. Immunol.*, **170**, 5188 (2003).

H-Lys-Val-Pro-Arg-Asn-Gln-Asp-Trp-Leu-OH

KVPRNQDWL

PCP-3922-PI — -20 °C — 1 mg, 5 mg

Human GP 100 (25–33)

(M.W. 1155.33) $C_{52}H_{82}N_{16}O_{14}$

MHC-class I-restricted epitope in hgp100

Heteroclitic MHC class I epitope in hgp100

W.W. Overwijk, A. Tsung, K.R. Irvine, M.R. Parkhurst, T.J. Goletz, K. Tsung, M.W. Carroll, C. Liu, B. Moss, S.A. Rosenberg, and N.P. Restifo, *J. Exp. Med.*, **188**, 277 (1998).
J.S. Gold, C.R. Ferrone, J.A.G.-Patino, W.G. Hawkins, R. Dyall, M.E. Engelhorn, J.D. Wolchok, J.J. Lewis, and A.N. Houghton, *J. Immunol.*, **170**, 5188 (2003).

Myelin Basic Protein (MBP) *See Myelin Oligodendrocyte Protein Fragment Peptides, below.*

Myelin Protein Fragments

Experimental autoimmune encephalomyelitis (EAE) has been used as a model for studying multiple sclerosis (MS) due to the clinical and histopathological similarities of the inflammatory diseases affecting the central nervous system. Both **Myelin PLP** (*PLP-3602-PI*) and **MOG** (*PMG-3660-PI*) are antigenic peptides that induce EAE by binding to MHC-II molecules on antigen presenting cells where they are recognized by class-II restricted T cells.

PI expands its line of antigenic peptides to now include: **MOG (40-54)** (*PMG-3962-PI*) and vesicular stomatitis virus octopeptide (52-59) or **VS-8** (*PVS-3961-PI*).[1] This antigen binds to K^b MHC-1 where the antigen is presented to T cells. It has been used in the past to study vacuolar processing of exogenous Ag and the role of TAP (transporter associated with antigen processing) during this event.[2] An understanding of events accompanying the processing and presentation of viral Ags can help assist in vaccine design and in the study of inflammatory-related diseases.

Bulk quantities and other EAE peptides are available, please inquire.

1. G.M. van Bleek and S.G. Nathenson, *Nature* (Lond.), **348**, 213 (1990).
2.. P.J. Chefalo and C.V. Harding, *J. Immunol.*, **167**, 1274 (2001).

Myelin Basic Protein (1-20)

MBP (1-20)

PMB-3972-PI — -20 °C — 1 mg, 5 mg

ASQKRPSQRSKYLATASTMD

H-Ala-Ser-Gln-Lys-Arg-Pro-Ser-Gln-Arg-Ser-Lys-Tyr-Leu-Ala-Thr-Ala-Ser-Thr-Met-Asp-OH

(M.W. 2226.51) $C_{92}H_{156}N_{30}O_{32}S$

Immunogenic Peptide

PRODUCT	CODE	QTY
Myelin Basic Protein (87-99) **MBP (87-99)** VHFFKNIVTPRTP H-Val-His-Phe-Phe-Lys-Asn-Ile-Val-Thr-Pro-Arg-Thr-Pro-OH (M.W. 1555.86) $C_{74}H_{114}N_{20}O_{17}$ *Encephalitogenic Determinant*	**PMB-3973-PI** -20 °C	1 mg 5 mg
Myelin Basic Protein (111-129) **MBP (111-129)** LSRFSWGAEGQRPGFGYGG H-Leu-Ser-Arg-Phe-Ser-Trp-Gly-Ala-Glu-Gly-Gln-Arg-Pro-Gly-Phe-Gly-Tyr-Gly-Gly-OH (M.W. 2029.22) $C_{92}H_{129}N_{27}O_{26}$ *Encephalitogenic Determinant*	**PMB-3974-PI** -20 °C	1 mg 5 mg
MOG (40-54) **Myelin Oligodendrocyte Protein (40-54)** YRSPFSRVVHLYRNG H-Tyr-Arg-Ser-Pro-Phe-Ser-Arg-Val-Val-His-Leu-Tyr-Arg-Asn-Gly-OH (M.W. 1851.12) $C_{84}H_{127}N_{27}O_{21}$ *Encephalitogenic Determinant* D. Sun, *et al.*, *Int. Immunol.*, *15*, 261 (2003)	**PMG-3962-PI** -20 °C	1 mg 5 mg
MOG (92-106) **Myelin Oligodendrocyte Protein (92-106)** DEGGYTCFFRDHSYQ H-Asp-Glu-Gly-Gly-Tyr-Thr-Cys-Phe-Phe-Arg-Asp-His-Ser-Tyr-Gln-OH (M.W. 1823.91) $C_{80}H_{104}N_{21}O_{27}S$ *Encephalitogenic Determinant*	**PMG-3968-PI** -20 °C	1 mg 5 mg
Myelin PLP (180-199) **Myelin Proteolipid Protein (180-199)** WTTCQSIAFPSKTSASIGSL H-Trp-Thr-Thr-Cys-Gln-Ser-Ile-Ala-Phe-Pro-Ser-Lts-Thr-Ser-Ala-Ser-Ile-Gly-Ser-Leu-OH (M.W. 2084.37) $C_{92}H_{144}N_{23}O_{30}S$ *Encephalitogenic Determinant*	**PLP-3966-PI** -20 °C	1 mg 5 mg
Myelin PLP (57–70) **Myelin Proteolipid Protein (57-70)** YEYLINVIHAFQYV H-Tyr-Glu-Tyr-Leu-Ile-Asn-Val-Ile-His-Ala-Phe-Gln-Tyr-Val-OH (M.W. 1772.05) $C_{87}H_{122}N_{18}O_{22}$ *Encephalitogenic Determinant*	**PLP-3970-PI** -20 °C	1 mg 5 mg
Myelin PLP (178-191) **Myelin Proteolipid Protein (178-191)** NTWTTCQSIAFPSK H-Asn-Thr-Trp-Thr-Thr-Cys-Gln-Ser-Ile-Ala-Phe-Pro-Ser-Lys-OH (M.W. 1582.79) $C_{70}H_{105}N_{18}O_{22}S$ *Encephalitogenic Determinant*	**PLP-3967-PI** -20 °C	1 mg 5 mg

Myelin Oligodendrocyte Protein (MOG) *See Myelin Oligodendrocyte Protein Fragment Peptides, see above.*

Myelin Proteolipid Protein (PLP) *See Myelin Oligodendrocyte Protein Fragment Peptides, see above.*

PRODUCT	CODE	QTY

Neuroendocrine Regulatory Peptides

Neuroendocrine Regulatory Peptide-1 (Human)

PNR-4441-s — -20 °C — 0.1 mg vial

RPESALLGGSEAGERLLQQGLAQVEA-NH_2
H-Arg-Pro-Glu-Ser-Ala-Leu-Leu-Gly-Gly-Ser-Glu-Ala-Gly-Glu-Arg-Leu-Leu-Gln-Gln-Gly-Leu-Ala-Gln-Val-Glu-Ala-NH_2
(M.W. 2679.00) $C_{113}H_{192}N_{36}O_{39}$
Endogenous Suppressor of Vasopressin Release

H. Yamaguchi, K. Sasaki, Y. Satomi, T. Shimbara, H. Kageyama, M.S. Mondal, K. Toshinai, Y. Date, L.J. Gonzalez, S. Shioda, T. Takao, M. Nakazato, and N. Minamino, *J. Biol. Chem.*, **282**, 26354 (2007). (*Original*)

Neuroendocrine Regulatory Peptide-1 (Rat)

PNR-4442-s — -20 °C — 0.1 mg vial

LEGSFLGGSEAGERLLQQGLAQVEA-NH_2
H-Leu-Glu-Gly-Ser-Phe-Leu-Gly-Gly-Ser-Glu-Ala-Gly-Glu-Arg-Leu-Leu-Gln-Gln-Gly-Leu-Ala-Gln-Val-Glu-Ala-NH_2
(M.W. 2558.80) $C_{110}H_{180}N_{32}O_{38}$
Endogenous Suppressor of Vasopressin Release

H. Yamaguchi, K. Sasaki, Y. Satomi, T. Shimbara, H. Kageyama, M.S. Mondal, K. Toshinai, Y. Date, L.J. Gonzalez, S. Shioda, T. Takao, M. Nakazato, and N. Minamino, *J. Biol. Chem.*, **282**, 26354 (2007). (*Original*)

Neuroendocrine Regulatory Peptide-2 (Human)

PNR-4443-s — -20 °C — 0.1 mg vial

EAEATRQAAAQEERLADLASDLLLQYLLQGGARQRGLG-NH_2
Pyr-Ala-Glu-Ala-Thr-Arg-Gln-Ala-Ala-Ala-Gln-Glu-Glu-Arg-Leu-Ala-Asp-Leu-Ala-Ser-Asp-
Leu-Leu-Leu-Gln-Tyr-Leu-Leu-Gln-Gly-Gly-Ala-Arg-Gln-Arg-Gly-Leu-Gly-NH_2
(M.W. 4064.50) $C_{173}H_{288}N_{56}O_{57}$
Endogenous Suppressor of Vasopressin Release

H. Yamaguchi, K. Sasaki, Y. Satomi, T. Shimbara, H. Kageyama, M.S. Mondal, K. Toshinai, Y. Date, L.J. Gonzalez, S. Shioda, T. Takao, M. Nakazato, and N. Minamino, *J. Biol. Chem.*, **282**, 26354 (2007). (*Original*)

Neuroendocrine Regulatory Peptide-2 (Rat)

PNR-4444-s — -20 °C — 0.1 mg vial

EAEATRQAAAQEERLADLASDLLLQYLLQGGARQRDLG-NH_2
Pyr-Ala-Glu-Ala-Thr-Arg-Gln-Ala-Ala-Ala-Gln-Glu-Glu-Arg-Leu-Ala-Asp-Leu-Ala-Ser-Asp-Leu-Leu-Leu-
Gln-Tyr-Leu-Leu-Gln-Gly-Gly-Ala-Arg-Gln-Arg-Asp-Leu-Gly-NH_2
(M.W. 4122.50) $C_{175}H_{290}N_{56}O_{59}$
Endogenous Suppressor of Vasopressin Release

H. Yamaguchi, K. Sasaki, Y. Satomi, T. Shimbara, H. Kageyama, M.S. Mondal, K. Toshinai, Y. Date, L.J. Gonzalez, S. Shioda, T. Takao, M. Nakazato, and N. Minamino, *J. Biol. Chem.*, **282**, 26354 (2007). (*Original*)

Neuronostatin-13 (Human)

PNS-4452-v — -20 °C — 0.5 mg vial

(Chimpanzee, Porcine, Canine, Ovine, Bovine, Chicken)
LRQFLQKSLAAAA-NH_2
Leu-Arg-Gln-Phe-Leu-Gln-Lys-Ser-Leu-Ala-Ala-Ala-Ala-NH_2
(M.W. 1415.7) $C_{64}H_{110}N_{20}O_{16}$
Brain/Gut Hormone in Pro-Somatostatin with Neuronal/Neuroendocrine/Cardiovascular Activity

W.K. Samson, J.V. Zhang, O. Avsian-Kretchmer, K. Cui, G.L.C. Yosten, C. Klein, R.-M. Lyu, Y.X. Wang, X.Q. Chen, J. Yang, C.J. Price, T.D. Hoyda, A.V. Ferguson, X.-bin Yuan, J.K. Chang, and A.J.W. Hsueh, *J. Biol. Chem.*, **283**, 31949 (2008). (*Original; Structure & Pharmacol.*)
Y. Hua, H. Ma, W.K. Samson, and J. Ren, *Am. J. Physiol. Regul. Integr. Comp. Physiol.*, **297**, 682 (2009). (*Pharmacol.*)

Neuropeptide B- 29 (Rat) (Non-Brominated Form)

NPB-29 (Rat) (Non-brominated)

PNP-4459-v — -20 °C — 0.5 mg vial

Trp-Tyr-Lys-Pro-Ala-Ala-Gly-Ser-His-His-Tyr-Ser-Val-Gly-Arg-Ala-Ala-Gly-Leu-
Leu-Ser-Ser-Phe-His-Arg-Phe-Pro-Ser-Thr
Synthetic Product

R. Fujii, H. Yoshida, S. Fukusumi, Y. Habata, M. Hosoya, Y. Kawamata, T. Yano, S. Hinuma, C. Kitada, T. Asami, M. Mori, Y. Fujisawa, and M. Fujino, *J. Biol. Chem.*, **277**, 34010 (2002). (*Original; cDNA Sequence*)
H. Tanaka, T. Yoshida, N. Miyamoto, T. Motoike, H. Kurosu, K. Shibata, A. Yamanaka, S.C. Williams, J.A. Richardson, N. Tsujino, M.G. Garry, M.R. Lerner, D.S. King, B.F. O'Dowd, T. Sakurai, and M. Yanagisawa, *Proc. Natl. Acad. Sci. U.S.A.*, **100**, 6251 (2003). (*Pharmacol.*)
S. Aikawa, M. Ishii, M. Yanagisawa, Y. Sakakibara, and T. Sakurai, *Regul. Pept.*,**151**,147 (2008). (*Pharmacol.; Food Intake Regulatory Activity*)
N. Hirashima, T. Tsunematsu, K. Ichiki, H. Tanaka, T.S. Kilduff, and A. Yamanaka, *Sleep*, in press. (*Pharmacol.; Slow Wave Sleep Induction Activity*)

PRODUCT	CODE	QTY

Peptide YY

Peptide YY (Dog, Mouse, Porcine, Rat, 3-36)

PYY (Dog, Mouse, Porcine, Rat, 3-36) — PYY-3726-PI (-20 °C) — 1 mg, 5 mg

(Acetate Salt)
(M.W. 3980.45) $C_{176}H_{272}N_{52}O_{54}$ [126339-09-1]
H-Ala-Lys-Pro-Glu-Ala-Pro-Gly-Glu-Asp-Ala-Ser-Pro-Glu-Glu-Leu-Ser-Arg-Tyr-Tyr-Ala-Ser-Leu-Arg-His-Tyr-Leu-Asn-Leu-Val-Thr-Arg-Gln-Arg-Tyr-NH_2
Physiological inhibitor for food intake/ NPY Y2-receptor agonist

D.Grandt, et al., *Regul. Peptides*, **40**, 161 (1992).
R.L.Batterham, *et al.*, Nature, **418**, 650 (2002).
R.L.Batterham, *et al.*, *N. Engl. J. Med.*, **349**, 941 (2003).
Y.Shechter, *et al.*, *FEBS Lett.*, **579**, 2439 (2005).
I.G.Halatchev and R.D.Cone, *Cell Metab.*, **1**, 159 (2005).
C.Acuna-Goycolea and A.N.van den Pol, *J. Neurosci.*, **25**, 10510 (2005).
G.H.Ballantyne, *Obes. Surg.*, **16**, 651 (2006)
PK Chelikani, *et al.*, *Am. J Phyiol Regul Integr Comp Physiol,*, **293**, R39, (2007).

Plectasin

Plectasin (*PDF-4432-s*) is a newly discovered defensin and the first to be isolated from a fungus, *Pseudoplectania nigrella*.[1] This peptide was shown to cure mice of *S. pneumoniae* induced, experimental peritonitis and pneumonia just as well as antibiotic treatment. The same concentration of plectasin that alters microbial growth also effectively kills the bacteria, suggesting the process is irreversible. Plectasin is also effective against antibiotic resistant strains of *S. pneumoniae* and exhibits low toxicity in mice models. This peptide should prove to be an exciting new addition to our growing number of antimicrobial products.

1. Mygind, *et al.*, *Nature*, **437**, 975 (2005). (*Original ; Structure & Antimicrobial Activity*)

Plectasin

PDF-4432-s (-20 °C) — 0.1 mg vial

(Fungus, *Pseudoplectania nigrella*)
Gly-Phe-Gly-Cys-Asn-Gly-Pro-Trp-Asp-Glu-Asp-Asp-Met-Gln-Cys-His-Asn-His-Cys-Lys-Ser-I
le-Lys-Gly-Tyr-Lys-Gly-Gly-Tyr-Cys-Ala-Lys-Gly-Gly-Phe-Val-Cys-Lys-Cys-Tyr
(M.W. 4401.9) $C_{189}H_{267}N_{53}O_{56}S_7$
Antimicrobial Peptide

Protease-Activated Receptor (PAR) Peptides

Proteinase-activated receptor (PAR) is a unique member of the G protein-coupled receptor (GPCR) family that is activated primarily by proteases. PAR_2 is activated by trypsin cleavage which can lead to a diverse number of physiological responses. For example, PARs have been reported to relax tracheal and bronchial smooth muscle cells and participate in hypotension, arterial vasodilation in diabetes, and gastric secretions.[1-4] PAR participation in tissue repair, cell survival, and inflammation following injury indicates that it may play an important role in controlling inflammatory-mediated diseases as well. In addition, PAR_2 is expressed by a wide number of tumor cells including breast and colon cancers, suggesting a role in angiogenesis.[5,6] *http://pepnet.com/products/parpeptides.pdf*

1. A. Kawabata, S. Kubo, T. Ishiki, N. Kawao, F. Sekiguchi, R. Kuroda, M.D. Hollenberg, T. Kanke, and N. Saito, *J. Pharmacol. Exp. Ther.*, **311**,402 (2004)..
2. Cicala, *et al.*, *THE FASEB J.*, **10**, 1996 (2001).
3. F. Roviezzo, M. Bucci, V. Brancaleone, A. Di Lorenzo, P. Geppetti, S. Farneti, L. Parente, G. Jungarella, S. Fiorucci, and G. Cirino, *Arteriosclerosis, Thrombosis, and Vasc. Biol.*, **25**, 2349 (2005).
4. Kawao, *et al.*, *British J. of Pharm.*, **135**, 1292 (2002).
5. D. Darmoul, V. Gratio, H. Devaud, T. Lehy, and M. Laburthe, *Am. J. Patho.*, **162**, 1503 (2003).
6. S. Even-Ram, B. Uziely , P. Cohen , S. Grisaru-Granovsky , M. Maoz , Y. Ginzburg , R. Reich R, I. Vlodavsky I, and R. Bar-Shavit, *Nat. Med.*, **4**, 909 (1998).

PAR_1 Peptides

H-Ala-Phe(para-Fluoro)-Arg-Cha-Cit-Tyr-NH_2

H-Ala-Phe(4-F)-Arg-Cha-Cit-Tyr-Amide — PAR-3931-PI (-20 °C) — 1 mg, 5 mg

(M.W. 656.83) $C_{29}H_{56}N_{10}O_7$
Protease-Activated Receptor 1 (PAR_1) Agonist

A. Kawabata, M. Saifeedine, B. A-Ani, L. Leblond, and M.D. Hollenberg, *J. of Pharm. and Exper. Therap.*, **288**, 358 (1999)

H-Phe-Leu-Leu-Arg-Asn-OH

PAR-3944-PI (-20 °C) — 1 mg, 5 mg

FLLRN
Protease-Activated Receptor 1 (PAR_1) Antagonist Acid Form

R.R. Vassallo, Jr, T. Kieber-Emmons, K. Cichowski, and L.F Brass, *J. Biol. Chem.*, **267**, 6081 (1992).

H-Phe-Leu-Leu-Arg-Asn-OH

PAR-3942-PI (-20 °C) — 1 mg, 5 mg

SFLLR-Amide
Protease-Activated Receptor 1 (PAR_1) Antagonist Acid Form

MD. Hollenberg, S.G. Yang, A.A. Laniyonu, C.J. Moore, and M. Saifeddine, *Mol. Pharmacol.*, **42**, 186 (1992).

H-Phe-Leu-Leu-Arg-Asn-OH

PAR-3936-PI (-20 °C) — 1 mg, 5 mg

SFLLR
Acid Form of PAR-3942-PI

H.-S. Ahn, C. Foster, G. Boykow, L. Arik, A.S.-Torhan, D. Hesk, and M. Chatterjee, *Mol. Pharmacol.*, **51**, 350 (1997).
M.D. Hollenberg, S.G. Yang, A.A. Laniyonu, C.J. Moore, and M. Saifeddine, *Mol. Pharmacol.*, **42**, 186 (1992).

PRODUCT	CODE	QTY

H-Phe-Thr-Leu-Leu-Arg-Asn-Pro-Asn-Asp-Lys-NH_2 — PAR-3926-PI (-20 °C) — 1 mg, 5 mg

FTLLRNPNDK-Amide

(M.W. 1215.67) $C_{54}H_{89}N_{17}O_{15}$

Protease-Activated Receptor 1 (PAR1) Negative Control Peptide Control for PAR_1 Agonist PAR-3925-PI

B.D. Blackhart, K. Emilsson, D. Nguyen, W. Teng, A.J. Martelli, S. Nystedt, J. Sundelin, and R.M. Scarborough, *J. Biol. Chem.*, **271**, 16466 (1996).

H-Ser-Phe-Leu-Leu-Arg-Asn-OH — PAR-3943-PI (-20 °C) — 1 mg, 5 mg

SFLLRN

Acid Form of PAR-3676-PI

H.-S. Ahn, C.Foster, G. Boykow, L. Arik, A.S.-Torhan, D. Hesk, and M. Chatterjee, *Mol. Pharmacol.*, **51**, 350 (1997).
R.R. Vassallo, Jr, T. Kieber-Emmons, K. Cichowski, and L.F. Brass, *J. Biol. Chem.*, **267**, 6081 (1992).

H-Ser-Phe-Leu-Leu-Arg-Asn-OH — PAR-3945-PI (-20 °C) — 1 mg, 5 mg

SFLLRNP

Protease-Activated Receptor 1 (PAR_1) Agonist Acid Form

M.L. Webb, D.S. Taylor, and C.J. Molloy, *Biochem. Pharmacol.*, **45**, 1577 (1993).

H-Ser-Phe-Leu-Leu-Arg-Asn-Pro-Asn-Asp-Lys-Tyr-Glu-Pro-Phe-NH_2 — PAR-3935-PI (-20 °C) — 1 mg, 5 mg

SFLLRNPNDKYEPF-Amide

J.R. Ngaiza and E.A. Jaffe, Biochem. *Biophys. Res. Commun.*, **179**, 1656 (1991).
D.M. Feng, D.F. Veber, T.M. Connolly, C. Condra, M.J. Tang, and R.F. Nutt, *J. Med. Chem.*,**38**,4125 (1995).

H-Ser-Phe-Leu-Leu-Arg-Asn-Pro-Asn-Asp-Lys-Tyr-Glu-Pro-Phe-OH — PAR-3934-PI (-20 °C) — 1 mg, 5 mg

SFLLRNPNDKYEPF

Acid Form of PAR-3935-PI

H.-S. Ahn, C. Foster, G. Boykow, L. Arik, A.S.-Torhan, D. Hesk, and M. Chatterjee, *Mol. Pharmacol.*, **51**, 350 (1997).
J.R. Ngaiza and E.A. Jaffe, *Biochem. Biophys. Res. Commun.*, **179**, 1656 (1991).
D.M. Feng, D.F. Veber, T.M. Connolly, C. Condra, M.J. Tang, and R.F. Nutt, *J. Med. Chem.*,**38**, 4125 (1995).

H-Ser-Phe-Leu-Leu-Cit-OH — PAR-3941-PI (-20 °C) — 1 mg, 5 mg

SFLLcit

(M.W. 656.83) $C_{29}H_{56}N_{10}O_7$

Protease-Activated Receptor 1 (PAR_1) Agonist

T. Sabo, *et al., Biochem. Biophys. Res. Commun.*, **188**, 604 (1992).

H-Thr-Phe-Leu-Leu-Arg-Asn-Pro-Asn-Asp-Lys-NH_2 — PAR-3925-PI (-20 °C) — 1 mg, 5 mg

TFLLRNPNDK-Amide

(M.W. 1215.67) $C_{54}H_{89}N_{17}O_{15}$

Protease-Activated Receptor 1 (PAR_1) Agonist

B.D. Blackhart, K. Emilsson, D. Nguyen, W. Teng, A.J. Martelli, S. Nystedt, J. Sundelin, and R.M. Scarborough, *J. Biol. Chem.*, **271**, 16466 (1996).

PAR_2 Peptides

2-Furoyl-Orn-Leu-Arg-Gly-Ile-Leu-NH_2 — PAR-3951-PI (-20 °C) — 1 mg, 5 mg

2-Furoyl-OLRGIL-Amide

(M.W. 777.97) $C_{36}H_{63}N_{11}O_8$

Protease-Activated Receptor 2 (PAR_2) Negative Control Peptide for PAR-3663-PI

J.J. McGuire, M. Saifeddine, C.R. Triggle, K. Sun, and M.D. Hollenberg, *J. of Pharm. Exp. Ther.*, **309**, 1124 (2004).

H-Leu-Ser-Ile-Gly-Arg-Leu-NH_2 — PAR-3913-PI (-20 °C) — 1 mg, 5 mg

LSIGRL-NH_2

(M.W. 656.83) $C_{29}H_{56}N_{10}O_7$

Protease-Activated Receptor 2 (PAR_2) Negative Control for PAR-3664-PI

H. Nishikawa, K. Kawai, M. Tanaka, H. Ohtani, S. Tanaka, C. Kitagawa, M. Nishida, T. Abe, H. Araki, and A. Kawabata, *J. Pharm. and Experim. Therap.*, **312**, 324 (2005).

H-Leu-Ser-Ile-Gly-Lys-Val-NH_2 — PAR-3920-PI (-20 °C) — 1 mg, 5 mg

LSIGKV-NH_2

(M.W. 614.79) $C_{28}H_{54}N_8O_7$

Protease-Activated Receptor 2 (PAR_2) Negative Control for PAR-3889-PI

I.A. Akers, M. Parsons, M.R. Hill, M.D. Hollenberg, S. Sanjar, G.J. Laurent, and R.J. McAnulty, *Am. J. Physiol. Lung Cell. Mol. Physiol.*, **278**, L193 (2000).
S. Miyata, N. Koshikawa, H. Yasumitsu, and K. Miyazaki, *J. Biol. Chem.*, **275**, 4592 (2000).
S. Miike, A.S. McWilliam, and H. Kita, *J. Immunol.*, **167**, 6615 (2001).

PRODUCT	CODE	QTY
H-Ser-Leu-Ile-Gly-Arg-NH_2 SLIGR-NH_2 Acetate Salt (M.W. 543.67) $C_{23}H_{45}N_9O_6$ *PAR_2 Agonist* R.M. Scarborough, *Curr. Med. Chem.*, **1**, 73 (2003). B. Al-Ani, *et al., J. Pharmacol. And Experim Therapm.*, **290**, 753 (1999).	PAR-3743-PI -20 °C	1 mg 5 mg
H-Ser-Leu-Ile-Gly-Arg-Leu-NH_2 SLIGRL-Amide ((M.W. 656.83) $C_{29}H_{56}N_{10}O_7$ *PAR_2 Tethered Ligand (Murine) / Protease-Activated Receptor 2 (PAR_2) Agonist* B. Al-Ani, M. Saifeddine, and M.D. Hollenberg, *Can. J. of Physiol. Pharmacol.*, **73**, 1203 (1995)	PAR-3664-PI -20 °C	1 mg 5 mg
H-Ser-Leu-Ile-Gly-Arg-Leu-OH SLIGRL *Acid Form of PAR-3664-PI* A. Bhattacharya, G.F. Smith, and M.L. Cohen, *J. Pharmacol. Exp. Ther.*, **297**, 573 (2001). B. Al-Ani, M. Saifeddine, and M.D. Hollenberg, *Can. J. of Physiol. Pharmacol.*, **73**, 1203 (1995).)	PAR-3940-PI -20 °C	1 mg 5 mg
H-Ser-Leu-Ile-Gly-Lys-Val-OH SLIGKV (M.W. 614.79) $C_{28}H_{54}N_8O_7$ *Acid Form of PAR-3889-PI* S.K. Bohm, W. Kong, D. Bromme, S.P. Smeekens, D.C. Anderson, A. Connolly, M. Kahn, H.A. Nelken, S.R. Coughlin, D.G. Payan, and N.W. Bunnett, *Biochem. J.*, **314**, 1009 (1996). W.R. Ferrell, J.C. Lockhart, E.B. Kelso, L. Dunning, R. Plevin, S.E. Meek, Andrew J.H. Smith, G.D. Hunter, J.S. McLean, F. McGarry, R. Ramage, L. Jiang, T. Kanke, and J. Kawagoe, *J. Clin. Invest.*, **111**, 35 (2003)..	PAR-3938-PI -20 °C	1 mg 5 mg

PAR_4 Peptides

PRODUCT	CODE	QTY
H-Ala-Tyr-Pro-Gly-Lys-Phe-OH AYPGKF *Acid form of PAR-3674-PI* E.A. Lidington, R. Steinberg, A.R. Kinderlerer, R.C. Landis, M. Ohba, A. Samarel, D.O. Haskard, and J.C. Mason, *Am J Physiol Cell Physiol*, **289**, C1437 (2005). M.D. Hollenberg, M. Saifeddine, S. Sandhu, S. Houle, and N. Vergnolle, *Br. J. Pharmacol.*, **143**, 443 (2004)	PAR-3939-PI -20 °C	1 mg 5 mg
H-Tyr-Ala-Pro-Gly-Lys-Phe-NH_2 YAPGKF-Amide *Protease-Activated Receptor 4 (PAR_4) Negative Control Peptide for PAR-3674-PI* M.D. Hollenberg, M. Saifeddine, S. Sandhu, S. Houle, and N. Vergnolle, *Br. J. Pharmacol.*, **143**, 443 (2004).	PAR-3933-PI -20 °C	1 mg 5 mg

RFamide-Related Peptide-3 (RFRP-3)

RFamide-Related Peptide-3 (RFRP-3) was discovered from the cDNA sequences, in which two other family peptides, RFRP-1 (Code 4380-s for one of the endogenous forms) and RFRP-2 are encoded.[1,2] Endogenous forms of human and rat RFRP-3 were determined to be an 8- and 18-residue peptide, respectively.[3,4] Biological activities of RFRP-3 include:

- function as gonadotropin inhibitory hormone (GnIH), resulting in the reduction in LH secretion
- increase in food intake and growth hormone secretion
- no effect on Kiss-1 mRNA expression.[5,6]

RFRP-3 should be especially valuable research tools in reproduction and puberty studies.

1. S. Hinuma, *et al., Nat.Cell Biol.*, **2**, 703 (2000). (*Original: Human & Rat cDNA*)
2. I.J. Clarke, *et al., Endocrinology*, **149**, 5811 (2008). (*Original: Ovine cDNA*)
3. T. Ubuka, *et al., PLoS One.*, **4**, e8400 (2009). (*Endogenous Form: Human RFRP-3*)
4. K. Ukena, *et al.,, FEBS Lett.*, **512**, 255 (2002). (*Endogenous Form: Rat RFRP-3*)
5. I.J. Clarke, *et al., Front.Neuroendocrinol.*, **30**, 371 (2009). (*Review: Pharmacol.*)
6. M.A. Johnson and G.S. Fraley, *Neuroendocrinology*, **88**, 305 (2008). (*Pharmacol.*)

PRODUCT	CODE	QTY
RFamide-Related Peptide-3 (Human) **[RFRP-3 (Human)]** Val-Pro-Asn-Leu-Pro-Gln-Arg-Phe-NH_2 (M.W. 969.14) $C_{45}H_{72}N_{14}O_{10}$ *Gonadotropin-Inhibitory Hormone* S. Hinuma, Y. Shintani, S. Fukusumi, N. Iijima, Y. Matsumoto, M. Hosoya, R. Fujii, T. Watanabe, K. Kikuchi, Y. Terao, T. Yano, T. Yamamoto, Y. Kawamata, Y. Habata, M. Asada, C. Kitada, T. Kurokawa, H. Onda, O. Nishimura, M. Tanaka, Y. Ibata, and M. Fujino, *Nat. Cell Biol.*, **2**, 703 (2000). (*Original: Human cDNA*) I.J. Clarke, I.P. Sari, Y. Qi, J.T. Smith, H.C. Parkington, T. Ubuka, J. Iqbal, Q. Li, A. Tilbrook, K. Morgan, A.J. Pawson, K. Tsutsui, R.P. Millar, and G.E. Bentley, *Endocrinology*, **149**, 5811 (2008). (*Original: Ovine cDNA*) T. Ubuka, K. Morgan, A.J. Pawson, T. Osugi, V.S. Chowdhury, H. Minakata, K. Tsutsui, R.P. Millar, and G.E. Bentley, *PLoS One*, **4**, e8400 (2009). (*Identification of RERP-3 in Human Hypothalamus*) I.J. Clarke, Y. Qi, I.P. Sari, and J.T. Smith, *Front. Neuroendocrinol.*, **30**, 371 (2009). (*Pharmacol.*)	PRF-4461-v -20 °C	0.5 mg vial

PRODUCT	CODE	QTY

RFamide-Related Peptide-3 (Rat)
[RFRP-3 (Rat)]

PRF-4462-v — -20 °C — 0.5 mg vial

Ala-Asn-Met-Glu-Ala-Gly-Thr-Met-Ser-His-Phe-Pro-Ser-Leu-Pro-Gln-Arg-Phe-NH_2
(M.W. 2020.30) $C_{88}H_{134}N_{26}O_{25}S_2$
Gonadotropin-Inhibitory Hormone

S. Hinuma, Y. Shintani, S. Fukusumi, N. Iijima, Y. Matsumoto, M. Hosoya, R. Fujii, T. Watanabe, K. Kikuchi, Y. Terao, T. Yano, T. Yamamoto, Y. Kawamata, Y. Habata, M. Asada, C. Kitada, T. Kurokawa, H. Onda, O. Nishimura, M. Tanaka, Y. Ibata, and M. Fujino, *Nat. Cell Biol.*, **2**, 703 (2000). (*Original: cDNA*)
K. Ukena, E. Iwakoshi, H. Minakata, and K. Tsutsui, *FEBS Lett.*, **512**, 255 (2002). (*Identification of RERP-3 in Rat Hypothalamus*)
M.A. Johnson, K. Tsutsui, and G.S. Fraley, *Horm. Behav.*, **51**,171 (2007). (*Pharmacol.*)
M.A. Johnson and G.S. Fraley, *Neuroendocrinology*, **88**,305 (2008). (*Pharmacol.*)
E. Ducret, G.M. Anderson, and A.E. Herbison,*Endocrinology*,**150**, 2799 (2009). (*Pharmacol.*)

Src Homology 2 Domain Ligand

Src Homology 2 Domain Ligand (Biotinylated)

SRC-3737-PI — -20 °C — 1 mg, 5 mg

(Acetate Salt)
Biotinyl-ε-aminocaproyl-Glu-Pro-Gln-Tyr(PO_3H_2)-Glu-Glu-Ile-Pro-Ile-Tyr-Leu-OH
(M.W. 1813.01) $C_{82}H_{122}N_{15}O_{27}SP$ [215876-01-0]

M Sonatore, *et al., Anal Biochem*, **240**, 289 (1996).
R-H Yeh, *et al., J. Biol Chem*, **276**, 12235 (2001).
X. Liu, *et al., Bull Korean Chem Soc*, **27**, 1353 (2006).
S.-H. Park, *et al., J. Med. Chem.*, **43**, 1173 (2000).

Thrombin Receptor Activating Peptides

H-Ala-Phe(para-Fluoro)-Arg-Cha-homoArg-Tyr-NH_2
H-Ala-Phe(4-F)-Arg-Cha-homoArg-Tyr-Amide

PAR-3939-PI — -20 °C — 1 mg, 5 mg

Thrombin Receptor Activating Peptide

D.M. Feng, D.F. Veber, T.M. Connolly, C. Condra, M.J. Tang, and R.F. Nutt, *J. Med. Chem.*,**38** 4125 (1995).
H.-S. Ahn, C.Foster, G. Boykow, L. Arik, A. S.-Torhan, D. Hesk, and M. Chatterjee, *Mol. Pharmacol.*, **51**, 350 (1997).

TMRIA-K4

TMRIA-K4

PTM-3401-v — -20 °C — 0.5 mg vial

S-[2-({4-[3,6-Bis(dimethylamino)xanthylium-9-yl]-3-carboxyphenyl}amino)-2-oxoethyl]-Cys-(Lys-Ile-Ala-Ala-Leu-Lys-Glu)$_4$
(Trifluoroacetate Form)
(M.W. 3578.40) $C_{169}H_{282}N_{40}O_{42}S$
Synthetic Product
Fluorophore Peptide in Coiled-Coil Tag-Probe Labeling System

Y. Yano, A. Yano, S. Oishi, Y. Sugimoto, G. Tsujimoto, N. Fujii, and K. Matsuzaki, *ACS Chem. Biol.*, **3**, 341 (2008). (*TMR-K4; Reference Paper to TMRIA-K4*)

Toxins

Biotinyl-ω-Agatoxin IVA
Biotinyl-ω-Aga-IVA

PAG-3402-s — -20 °C — 0.1 mg vial

(Trifluoroacetate Form)
Biotinyl-Lys-Lys-Lys-Cys-Ile-Ala-Lys-Asp-Tyr-Gly-Arg-Cys-Lys-Trp-Gly-Gly-Thr-Pro-Cys-Cys-Arg-Gly-Arg-Gly-Cys-Ile-Cys-Ser-Ile-Met-Gly-Thr-Asn-Cys-Glu-Cys-Lys-Pro-Arg-Leu-Ile-Met-Glu-Gly-Leu-Gly-Leu-Ala
(Disulfide bonds between Cys^4-Cys^{20}, Cys^{12}-Cys^{25}, Cys^{19}-Cys^{36} and Cys^{27}-Cys^{34})
(M.W. 5428.5) $C_{227}H_{374}N_{70}O_{62}S_{11}$
Reagent for Localization Study of ω-Agatoxin IVA Binding Site

H. Nishio, K. Y. Kumagaye, S. Kubo, Y.-N. Chen, A. Momiyama, T. Takahashi, T. Kimura, and S. Sakakibara, *Biochem. Biophys. Res. Commun.*, **196**, 1447 (1993). (*Chem. Synthesis & Biological Activity*)
S. Nakanishi, A. Fujii, T. Kimura, S. Sakakibara, and K. Mikoshiba, *J. Neurosci. Res.*, **41**, 532 (1995). (*Biochem.: Distribution of Binding Sites*)

μ-Conotoxin SIIIA

PCN-4440-v — -20 °C — 0.5 mg vial

(Marine Snail, *Conus striatus*)
Pyr-NCCNGGCSSKWCRDHARCC-NH_2
Pyr-Asn-Cys-Cys-Asn-Gly-Gly-Cys-Ser-Ser-Lys-Trp-Cys-Arg-Asp-His-Ala-Arg-Cys-Cys-NH_2
(Disulfide bonds between Cys^3-Cys^{13}, Cys^4-Cys^{19}, and Cys^8-Cys^{20})
(M.W. 2207.5) $C_{83}H_{123}N_{33}O_{27}S_6$
Tetrodotoxin-Resistant Na^+ Channel Blocker with Analgesic Activity

G. Bulaj, P.J. West, J.E. Garrett, M. Marsh, M.-M. Zhang, R.S. Norton, B.J. Smith, D. Yoshikami, and B.M. Olivera, *Biochemistry*, **44**, 7259 (2005). (*Original; Primary Structure & Pharmacol.*)
S. Yao, M.-M. Zhang, D. Yoshikami, L. Azam, B.M. Olivera, G. Bulaj, and R.S. Norton, *Biochemistry*, **47**, 10940 (2008). (*Solution Structure & Pharmacol.*)
C.-Z. Wang, H. Zhang, H. Jiang,W. Lu, Z.-Q. Zhao, and C.-W. Chi, *Toxicon*, **47**, 122 (2006). (*Pharmacol.*)
B.R. Green, P. Catlin, M.-M. Zhang, B. Fiedler, W. Bayudan, A. Morrison, R.S. Norton, B.J. Smith, D. Yoshikami, B.M. Olivera, and G. Bulaj, *Chem. Biol.*, **14**, 399 (2007). (*Pharmacol.*)

PLEASE NOTE: For shipping within the United States, please contact Peptides International for important information regarding the CDC Select Agent Transfer Program and additional requirements for placing orders. Conotoxin peptides are not available for export without a license from the US Department of Commerce.

PRODUCT	CODE	QTY

Enterotoxin STp
ENT-3744-PI -20 °C — 1 mg, 5 mg

(Trifluoroacetate Salt)
H-Asn-Thr-Phe-Tyr-Cys-Cys-Glu-Leu-Cys-Cys-Asn-Pro-Ala-Cys-Ala-Gly-Cys-Tyr-OH
(Disulfide bonds between Cys^5 and Cys^{10}; Cys^6 and Cys^{14}; Cys^9 and Cys^{17})
(M.W. 1972.28) $C_{81}H_{110}N_{20}O_{26}S_6$ [115474-04-9]
E.coli enterotoxin STp

K.Okamoto, *et al*., *Infect. Immun*., **55**, 2121 (1987).
K.Okamoto and M.Takahara, *J. Bacteriol*., **172**, 5260 (1990).
H.Ozaki, *et al*., *J. Biol. Chem*., **266**, 5934 (1991).
H.Yamanaka, *et al*., *Microbiol. Immunol*., **37**, 195 (1993).
H.Yamanaka, *et al*., J. *Bacteriol*., **176**, 2906 (1994).

Guangxitoxin

Recent efforts for identifying new drugs for Type II Diabetes have focused on inhibitors that target the delayed-rectifier K^+ current (I_{DR}), found in insulin secreting β-cells and believed to aide in repolarizing action potentials.[1] Such inhibitors may increase cytosolic calcium levels and insulin secretion.[2,3] A novel peptide toxin, **guangxitoxin (GxTX)-1E** (*PGX-4433-s*), was found to inhibit mouse I_{DR} by 90%, selectively block $K_v2.1/K_v2.2$ channels (IC_{50} ~1 nmol/l), and shift the voltage-dependence for channel activation to more positive potentials, acting as a gating modifier peptide.[4] Furthermore, GxTX-1E was able to increase the duration of action potentials (30% ± 6%), calcium oscillations, and insulin secretion (3.5 fold) in a glucose dependent manner in β-cell I_{DR}.[2,3,4,5] This novel peptide may help determine the mechanism and role of β-cell I_{DR} in insulin secretion and lead to better glucose-dependent methods for treatment of Type II Diabetes.

1. P.A. Smith, K. Bokvist, P. Arkhammar, P.O. Berggren, and P. Rorsman, *J. Gen. Physiol*., **95**, 1041 (1990).
2. P.E. MacDonald, S. Sewing, J. Wang, J.W. Joseph, S.R. Smukler, G. Sakellaropoulos, M.C. Saleh, C.B. Chan, R.G. Tsushima, A.M. Salapatek, and M.B.Wheeler, *J. Biol. Chem*., **277**, 44938 (2002).
3. P.E. MacDonald, X.F. Ha, J. Wang, S.R. Smukler, A.M. Sun, H.Y. Gaisano, A.M. Salapatek, P.H. Backx, and M.B.Wheeler, *Mol. Endocrinol*., **15**, 1423 (2001).
4. J. Herrington, Y.-P. Zhou, R.M. Bugianesi, P.M. Dulski, Y. Feng, V.A. Warren, M.M. Smith, M.G. Kohler, V.M. Garsky, M. Sanchez, M. Wagner, K. Raphaelli, P. Banerjee, C. Ahaghotu, D. Wunderler, B.T. Priest, J.T. Mehl, M.L. Garcia, O.B. McManus, G.J. Kaczorowski, and R.S. Slaughter, *Diabetes*, **55**,1034 (2006).
5. L. Yan, D.J. Figueroa, C.P. Austin, Y. Liu, R.M. Bugianesi, R.S. Slaughter, G.J. Kaczorowski, and M.G. Kohler, *Diabetes*, **53**, 597 (2004).

Guangxitoxin-1E
GxTX-1E
PGX-4433-s -20 °C — 0.1 mg vial

(Tarantula, *Pleisiophrictus guangxiensis sp. nov.*)
(Trifluoroacetate Form)
Glu-Gly-Glu-Cys-Gly-Gly-Phe-Trp-Trp-Lys-Cys-Gly-Ser-Gly-Lys-Pro-Ala-Cys-Cys-Pro-
Lys-Tyr-Val-Cys-Ser-Pro-Lys-Trp-Gly-Leu-Cys-Asn-Phe-Pro-Met-Pro
(Disulfide bonds undetermined)
(M.W. 3948.60) $C_{178}H_{248}N_{44}O_{45}S_7$
$K_v2.1/K_v2.2$ Channel Blocker / Enhancer of Glucose-Dependent Insulin Secretion

J. Herrington, Y.-P. Zhou, R.M. Bugianesi, P.M. Dulski, Y. Feng, V.A. Warren, M.M. Smith, M.G. Kohler, V.M. Garsky, M. Sanchez, M. Wagner, K. Raphaelli, P. Banerjee, C. Ahaghotu, D. Wunderler, B.T. Priest, J.T. Mehl, M.L. Garcia, O.B. McManus, G.J. Kaczorowski, and R.S. Slaughter, *Diabetes*, **55**, 1034-1042 (2006).
P.E. MacDonald, S. Sewing, J. Wang, J.W. Joseph, P.E. MacDonald, S. Sewing, J. Wang, J.W. Joseph, S.R. Smukler, G. Sakellaropoulos, J.Wang, M.C. Saleh, C.B. Chan,R.G. Tsushima, A.M.F. Salapatek, and M.B. Wheeler, *J. Biol. Chem*., **277**, 44938 (2002).(*Pharmacol.; Role of Kv2.1 in Glucose-Dependent Insulin Secretion*)
N.A. Tamarina, A. Kuznetsov, L.E. Fridlyand, and L.H. Philipson, *Am. J. Physiol. Endocrinol. Metab*., **289**,E578 (2005).(*Pharmacol.; Role of Kv2.1 in Glucose-Dependent Ca^{2+} response*)

Huwentoxin- IV
HWTX-IV
PLL-4455-s -20 °C — 0.1 mg vial

Chinese Bird Spider, (*Ornithoctonus huwena*)
(Trifluoroacetate Form)
Glu-Cys-Leu-Glu-Ile-Phe-Lys-Ala-Cys-Asn-Pro-Ser-Asn-Asp-Gln-Cys-Cys-Lys-Ser-Ser-Lys-Leu-Val-Cys-Ser-Arg-Lys-Thr-Arg-Trp-Cys-Lys-Tyr-Gln-Ile-NH_2
(Disulfide bonds between Cys^2-Cys^{17}, Cys^9-Cys^{24}, and Cys^{16}-Cys^{31})
(M.W. 4106.80) $C_{174}H_{278}N_{52}O_{51}S_6$
Synthetic Product
Neuronal Tetrodotoxin-Sensitive Na^{+-} Channel Blocker

K. Peng, Q. Shu, Z. Liu, and S. Liang, *J. Biol. Chem*., **277**, 47564 (2002). (*Original*)
J. Diao, Y. Lin, J. Tang, and S. Liang, *Toxicon*, **42**, 715 (2003). (*cDNA Seq*)
Y. Xiao, J.-P. Bingham, W. Zhu, E. Moczydlowski, S. Liang, and T.R. Cummins, *J. Biol. Chem*., **283**, 27300 (2008). (*Pharmacol.*)
Y. Xiao, X. Luo, F. Kuang, M. Deng, M. Wang, X. Zeng, and S. Liang, *Toxicon*, **51**, 230 (2008). (*Pharmacol.*)

Purotoxin- 1
PPT-4457-v -20 °C — 0.01 mg vial

(Wolf Spider, *Geolycosa* sp.)
Gly-Tyr-Cys-Ala-Glu-Lys-Gly-Ile-Arg-Cys-Asp-Asp-Ile-His-Cys-Cys-Thr-Gly-Leu-
Lys-Cys-Lys-Cys-Asn-Ala-Ser-Gly-Tyr-Asn-Cys-Val-Cys-Arg-Lys-Lys
(Reported disulfide bonds between Cys^3-Cys^{16}, Cys^{10}-Cys^{21}, Cys^{15}-Cys^{32}, and Cys^{23}-Cys^{30})
(M.W. 3836.50) $C_{155}H_{248}N_{50}O_{48}S_8$
Synthetic Product
Inhibitor of P2X3 Purinoreceptors

E.V. Grishin, G.A. Savchenko, A.A. Vassilevski, Y.V. Korolkova, Y.A. Boychuk, V.Y. Viatchenko-Karpinski, K.D. Nadezhdin, A.S. Arseniev, K.A. Pluzhnikov, V.B. Kulyk, N.V. Voitenko, and O.O. Krishtal, *Ann. Neurol*., **67**, 680 (2010). (*Original; Structure & Pharmacol.*)

ProTx-II

ProTx-I and **ProTx-II** were first isolated and characterized from the venom of tarantula *Thrixopelma pruriens*.[1-3] These peptide toxins belong to the inhibitory cystine knot (ICK) family, which is known to interact with voltage-gated ion channels. They are unique because they alter the rate of activation rather than inactivation of channels. Otherwise, there is no sequence homology between ProTx-I and Pro-Tx-II. ProTx-II is the newest toxin currently offered by Peptides International and produced by the Peptide Institute in Japan. It was shown to be at least 100-fold selective for Na_v1.7 channel with an IC50 of 0.3 nM.4 Sodium channel subtype Na_v1.7 has a role in modulating neuronal signaling for pain, and recent studies indicate loss-of-function mutations in Na_v1.7 cause insensitivity to pain.[5] Others have identified gain-of-function mutations in Nav1.7 as the cause of certain pain disorders.[6-8] Thus Na_v1.7 is a potential target for the development of analgesics.

The highly sensitive nature of ProTx-II for Na_v1.7 is believed to be due to the presence of a unique phenylalanine residue (F813) present in the C-terminal domain II S3 of the channel, which makes it different than the other sodium channel subtypes. Indeed, mutation of the F813 residue to glycine or serine reduced the sensitivity of ProTx-II significantly.[4]

Evidence indicates ProTx-II may not be able to cross the blood-nerve barrier since intravenous administration in rats did not significantly block acute pain response. In addition, the toxin can block C-fiber action potential propagation in desheathed but not intact nerves.[4] While this may limit the use of ProTx-II, the toxin should still act as an important tool for locating novel inhibitors for Na_v1.7.

1. R.E. Middleton, *et al.*, *Biochemistry*, **41**, 14734 (2002). (*Original*)
2. B.T. Priest, *et al.*, *Toxicon*, **49**, 194 (2007). (*Review*)
3. J.J. Smith, *et al.*, *J. Biol. Chem.*,**282**, 12687 (2007). (*Pharmacol.; Novel Toxin Binding Site Coupled to Na_v Activation*)
4. W.A. Schmalhofer, *et al., Mol. Pharmacol.*, **74**,1476 (2008).
5. S.D. Dib-Hajj, *et al.*, *Trends Neurosci,* **30**, 555 (2007).
6. C.R. Fertleman, *et al.*, *Neuron*, **52**, 767 (2006).
7. C. Han, *et al.*, *Ann Neurol.*, **59**, 553 (2006).
8. Y. Yang,*et al.*, *Journal of Med. Genetics*, 41171 (2004).

ProTx-II

PTX-4450-s -20 °C 0.1 mg vial

Synthetic Product
(Tarantula, *Thrixopelma pruriens*)
YCQKWMWTCDSERKCCEGMVCRLWCKKKLW
Tyr-Cys-Gln-Lys-Trp-Met-Trp-Thr-Cys-Asp-Ser-Glu-Arg-Lys-Cys-Cys-Glu-Gly-Met-Val-Cys-Arg-Leu-Trp-Cys-Lys-Lys-Lys-Leu-Trp
(Disulfide bonds between Cys^2-Cys^{16}, Cys^9- Cys^{21}, and Cys^{15}-Cys^{25})
(M.W. 3826.60) $C_{168}H_{250}N_{46}O_{41}S_8$
Na^+ Channel (Especially Nav1.7) / Ca_2^+ Channel Blocker
(Gating Modifier)

R.E. Middleton, V.A. Warren, R.L. Kraus, J.C. Hwang, C.J. Liu, G. Dai, R.M. Brochu, M.G. Kohler, Y.-D. Gao, V.M. Garsky, M.J. Bogusky, J.T. Mehl, C.J. Cohen, and M.M. Smith, *Biochemistry*, **41**, 14734 (2002). (*Original*)
J.J. Smith, T.R. Cummins, S. Alphy, and K.M. Blumenthal, *J. Biol. Chem.*, **282**, 12687 (2007). (*Pharmacol.; Novel Toxin Binding Site Coupled to Nav Activation*)
W.A. Schmalhofer, J. Calhoun, R. Burrows, T. Bailey, M.G. Kohler, A.B. Weinglass, G.J. Kaczorowski, M.L. Garcia, M. Koltzenburg, and B.T. Priest, *Mol. Pharmacol*, **74**, 1476 (2008). (*Pharmacol.; Inhibition of Na_v1.7 Channels*)
S.D. Dib-Hajj, T.R. Cummins, J.A. Black, and S.G. Waxman, *Trends Neurosci.*, **30**, 555 (2007). (*Review*)
B.T. Priest, K.M. Blumenthal, J.J. Smith, V.A. Warren, and M.M. Smith, *Toxicon*, **49**, 194 (2007). (*Review*)

Psalmotoxin

The acid-sensing ion channel (ASIC) family is involved with pain perception, learning, and memory. In addition, the ion channels may contribute to brain injury and neuronal death. ASIC is stimulated by H^+ ligand, and activation is calcium dependent.[1,2]

Peptide toxins have been invaluable tools for inhibition of ion conductance pathways and in functional/structural studies of channels. **Psalmotoxin 1** (*PTX-4435-s*), isolated from the venom of tarantula *Psalmopoeus cambridgei*, is the first potent peptide blocker shown to inhibit ASIC1a by increasing affinity of the channel for H^+, leading to receptor desensitization.[4,5,6] This toxin showed promise as a neuroprotective agent for ASIC1a mediated ischemic brain injury (100 ng/ml) and could selectively inhibit malignant glioma (IC_{50} = 36 pM) Na^+ channels (both inward and outward).[7,8] Further studies of Psalmotoxin ASIC1a interaction could lead to potential diagnosis and therapy of these and other ASIC1a-related diseases. *http://pepnet.com/products/qrtoxins.pdf*

1. E.L. Bässler, *et. al., J. Biol. Chem.*, **276**, 33782 (2001).
2. E. Babini, *et. al.*, *J.Biol. Chem.*, **277**, 41597 (2002).
3. V.I. Pidoplichko and J.A. Dani, *PNAS*, **203**, 11376 (2006).
4. P. Escoubas, *et. al.*, *J. Biol. Chem.*, **275**, 25116 (2000).
5. M. Salinas, *et. al.*, *J. Physiol.*, **570**, 339 (2005).
6. X. Chen, *et. al.*, *J. Gen. Physiol.*, **126**, 71 (2005).
7. G. Pignataro, *et. al.*, *Brain*, **10**, 1093 (2006).
8. J.K. Bubien, *et. al.*, *Am. J. Physiol. Cell Physiol.*, **287**, C1282 (2004).

Psalmotoxin 1

PcTX1

PTX-4435-s -20 °C 0.1 mg vial

(South American Tarantula, *Psalmopoeus cambridgei*)
(Trifluoroacetate Form)
Glu-Asp-Cys-Ile-Pro-Lys-Trp-Lys-Gly-Cys-Val-Asn-Arg-His-Gly-Asp-Cys-Cys-Glu-Gly-Leu-Glu-Cys-Trp-Lys-Arg-Arg-Arg-Ser-Phe-Glu-Val-Cys-Val-Pro-Lys-Thr-Pro-Lys-Thr
(Disulfide bonds between Cys^3-Cys^{18}, Cys^{10}-Cys^{23}, and Cys^{17}-Cys^{33})
(M.W. 4689.40) $C_{200}H_{312}N_{62}O_{57}S_6$
Selective Blocker for Acid-Sensitive Ion Channel, ASIC1a

P. Escoubas, J.R. De Weille, A. Lecoq, S. Diochot, R. Waldmann, G. Champigny, D. Moinier, A. Menez, and M. Lazdunski, *J. Biol. Chem.*, **275**, 25116 (2000). (*Original; Primary Structure & ASIC Blocking Selectivity*)
P. Escoubas, C. Bernard, G. Lambeau, M. Lazdunski, and H. Darbon, *Protein Sci.*, **12**, 1332 (2003). (*Three-dimensional Solution Structure*)
X. Chen, H. Kalbacher, S. Grunder, *J. Gen. Physiol.*, **127**, 267 (2006). (*Pharmacol.; State-Dependent Function*)

PRODUCT	CODE	QTY

Uroguanylin Isomer B (Human)

Uroguanylin is a well-known activator of guanylyl cyclase-C (GC-C) in the intestine. Regulation of natriuresis in the kidney postprandial is another important function of this peptide.[1] In the case of human uroguanylin,[2] the so-called topological isomers (isomer A and isomer B in this catalog) are generated because of the carboxyl-terminal extension of Leu residue from the core structure formed by two disulfide bonds in a 1-3/2-4 pattern that results in two topological stereoisomers. Isomer A (Code 4295-s) stimulates GC-C, whilst isomer B is a weak agonist in this assay.[3] What is the biological role of isomer B? The answer was obtained recently, that isomer B possesses natriuretic activity with a sigmoidal dose-response curve (ED50 = 20 nmol/kg in rats).[4] It is of interest that isomer A also shows natriuretic activity at 25 nmol/kg. However, a distinct bell-shaped dose-response curve was observed. Furthermore, co-administration of isomer A (100 nmol/kg) and isomer B (35 nmol/kg) induced almost as efficient natriuretic response as that of a mere administration of isomer A, indicating that a large amount of coexisting isomer A antagonize, even in part, the natriuretic activity of isomer B. Considering the report that uroguanylin and guanlylin exert natriuretic activity in mice even lacking the GC-C receptor,[5] the natriuresis of uroguanylin might be mediated by a novel receptor other than GC-C. The availability of synthetic human uroguanylin isomer A and isomer B should allow for more precise research to help clarify the complicated biological response of the individual topological isomers.

Please note: It has been reported that isomer A and isomer B of human uroguanylin are interconvertible in solution.[6] Keeping the prepared solution at low temperature (below 4 ºC) should help avoid this possible interconversion.

1. L.R. Forte, *J. Clin. Invest.*, **112**. 1138 (2003). (*Review: Natriuretic Peptide*)
2. T. Kita, *et al., Am. J. Physiol.*, **266**, F342 (1994). *(Original)*
3. M. Nakazato, *et al., Biochem. Biophys. Res. Commun.*, **220**, 586 (1996). *(GC-C Stimulating Activity of Topological Isomers)*
4. N.G. Moss, *et al., Hypertension*, **53**, 867 (2009). (*Natriuretic Activity of Topological Isomers*)
5. S.L. Carrithers, *et al., Kidney Int.*, **65**, 40 (2004). (*GC-C-Independent Natriuretic Activity*)
6. N. Chino, *et al., FEBS Lett.*, **421**, 27 (1998). *(Interconversion of Topological Isomers)*

Uroguanylin Isomer B (Human) (0.1 mg vial)

PUG-4463-s — -20 °C — 0.1 mg vial

Asn-Asp-Asp-Cys-Glu-Leu-Cys-Val-Asn-Val-Ala-Cys-Thr-Gly-Cys-Leu
(Disulfide bonds between Cys^4-Cys^{12} and Cys^7-Cys^{15})
(Trifluoroacetate Form)
(M.W. 1667.90) $C_{64}H_{102}N_{18}O_{26}S_4$
Natriuretic Factor

T. Kita, C.E. Smith, K.F. Fok, K.L. Duffin, W.M. Moore, P.J. Karabatsos, J.F. Kachur, F.K. Hamra, N.V. Pidhorodeckyj, L.R. Forte, and M.G. Currie, *Am. J. Physiol.*, **266**, F342 (1994). (*Original: Primary Structure*)
M. Nakazato, H. Yamaguchi, H. Kinoshita, K. Kangawa, H. Matsuo, N. Chino, and S. Matsukura, *Biochem. Biophys. Res. Commun.*, **220**, 586 (1996). (*Pharmacol.; cGMP Production Activity of Topological Isomers*)
N.G. Moss, D.A. Riguera, R.M. Solinga, M.M. Kessler, D.P. Zimmer, W.J. Arendshorst, M.G. Currie, and M.F. Goy, *Hypertension*, **53**, 867 (2009). (*Pharmacol.: Natriuretic Activity of Topological Isomers*)

Urotensin Peptides

Urotensin II is one of the most potent vasoconstrictors known, and **Urantide** has been reported to be the most potent antagonist of urotensin II - until now.[1,2] Recent studies replacing the Asp amino acid in Urantide led to the discovery of a new urotensin II antagonist, **H-Tic-[Pen-Phe-D-Trp-Orn-Tyr-Cys]-Val-OH**. It was found to be more potent than Urantide at inducing contractions in isolated rat thoracic aorta, with a pA_2 value of 9.0 compared to a pA_2 value of 8.3 for Urantide.[3]

1. R.S. Ames, *et al., Nature*, **401**, 282 (1999).
2. R. Patacchini, *et al., Br. J. Pharmacol.*, **140**, 1155 (2003).
3. Patent N. FI2007A000032. Patent N. FI2006A000340

H-Tic-[Pen-Phe-D-Trp-Orn-Try-Cys]-Val-OH

PUT-3928-PI — -20 °C — 1 mg

(M.W. 1119.38) $C_{57}H_{70}N_{10}O_{10}S$
Potent Urotensin II Antagonist

M. Sala, L. Auriemma, T. Campiglia, I. Gomez-Monterrey, P. Santicioli, C.A. Maggi, P. Rovero, A. Carotenuto, E. Novellino, and P. Grieco, Poster Presentation at the 20th American Peptide Symposium, Montreal, Canada (2007).
Patent N. FI2007A000032. Patent N. FI2006A000340

Vesicular Stomatitis Virus Nucleoprotein (VSV)

H-Arg-Gly-Tyr-Val-Tyr-Gln-Gly-Leu-OH

PVS-3961-PI — -20 °C — 1 mg, 5 mg

RGYVYQGL
(M.W. 955.09) $C_{44}H_{66}N_{12}O_{12}$
Vesicular Stomatitis Virus (VSV)Nucleoprotein (52 - 59), VSV - 8

Viral Protein 2 (70-86)

VP2 (70-86)

Viral Protein 2 (70-86)

PVP-3971-PI — -20 °C — 1 mg, 5 mg

H-Trp-Thr-Thr-Ser-Gln-Glu-Ala-Phe-Ser-His-Ile-Arg-Ile-Pro-Leu-Pro-His-OH
(M.W. 2020.30) $C_{93}H_{138}N_{26}O_{25}$
Encephalitogenic Determinant

Richard K. Burt, Josette Padilla, Mauro C. Dal Canto, and Stephen D. Miller, *Blood*, **94**, 2915 (1999).

PRODUCT	CODE	QTY

Enzyme Substrates

PRODUCT	CODE	QTY
Abz-Ala-Phe-Arg-Phe-Ser-Gln-EEDnp (M.W. 1082.15) $C_{50}H_{63}N_{15}O_{13}$ *Substrate for Human Kallikrein 6 (hK6)*	**SFQ-3915-PI** -20 °C	1 mg 5 mg
Abz-Arg-Arg-Arg-Arg-Ser-Ala-Gly-Tyr(NO_2)-NH_2 (M.W. 1184.30) $C_{48}H_{77}N_{23}O_{13}$ *Substrate for Human Kallikrein 6 (hK6)*	**SFQ-3957-PI** -20 °C	1 mg 5 mg
Abz-Gly-Phe(NO_2)-Pro-OH (M.W. 438.48) $C_{23}H_{25}N_5O_7$ [67482-93-3] *Substrate for ACE (Angiotensin-I Converting Enzyme)* A. Carmel and A. Yaron, *Eur. J. Biochem.*, **87**, 265 (1978).	**SFQ-3937-PI** -20 °C	5 mg 25 mg
Abz-Lys-Lys-Gln-Arg-Ala-Gly-Val-Leu-Tyr(NO_2)-NH_2 Abz-KKQRAGVLY(NO_2)-NH_2 (M.W. 1225.43) $C_{55}H_{88}N_{18}O_{14}$ *Substrate for for Dengue Virus Non-Structural Protein 3 (NS3) Serine Protease* P. Niyomrattanakit, S. Yahorava, I. Mutule, F. Muturlis, R. Petrovska, P. Prusis, G. Katzenmeier, and J.E.S. Wikberg, *Biochem. J.*, **397**, 203-211 (2006).	**SFQ-3958-PI** -20 °C	1 mg 5 mg
Abz-Thr-Asn-Met-Lys-His-Met-Ala-Gly-Ala-Ala-Gln-EDDnp (M.W. 1486.66) $C_{61}H_{91}N_{21}O_{19}S_2$ *Substrate for Cellular Prion Protein (PrP^c)*	**SFQ-3916-PI** -20 °C	1 mg 5 mg
Ac-Asp-Glu-Asp(Edans)-Glu-Glu-Abu-L-Lactoyl-Ser-Lys(Dabcyl)-NH2 (M.W. 1082.15) $C_{50}H_{63}N_{15}O_{13}$ *Internally quenched fluorogenic substrate for the continuous monitoring of hepatitis C virus NS3 protease activity* C. Lin, et al., *J. Biol. Chem.*, **10**, 1074 (2004). N. Kakiuchi, *et al., J. Virol. Methods,* **80**, 77 (1999); Y. Liu, *et al.*, *Anal. Biochem.*, **267**, 331 (1999); M. Taliani, *et al.*, *Anal. Biochem.*, **240**, 60 (1996).	**SFQ-3730-PI** -20 °C	1 mg
Ac-Arg-Gly-Lys(Ac)-MCA **Ac-RLR-MCA** **Ac-RGK(Ac)-AMC** (M.W. 600.68) $C_{28}H_{40}N_8O_7$ [660846-97-9] D. Wegener, *at al., Chem. Biol.*, **10**, 61 (2003).	**SRK-3728-PI** -20 °C	1 mg 5 mg
Ac-Arg-Leu-Arg-MCA **Ac-RGK(Ac)-MCA** (Acetate Salt) (M.W. 600.68) $C_{30}H_{46}N_{10}O_6$ [929903-87-7] A.F. Kisselev, *et al., J. Biol. Chem.*, **281** (2006). A.F. Kisselev and A.L.Goldberg, *Meth. Enzy.*, **398** (2005). K.J. Rogders and R.T. Dean, *Intl. J. Biochem.Cell.Biol*,. **35** (2003)	**MCA-3729-PI** -20 °C	1 mg 5 mg
Ac-Glu-Ser-Glu-Asn-MCA Ac-ESEN-MCA Acetyl-L-glutamyl-L-seryl-L-glutamyl-L-asparagine α-(4-methylcoumaryl-7-amide) (M.W. 676.63) $C_{29}H_{36}N_6O_{13}$ *Substrate for Vacuolar Processing Enzyme (VPE)* M. Kuroyanagi, M. Nishimura, and I. Hara-Nishimura, *Plant Cell Physiol.*, **43**, 143 (2002). N. Hatsugai, M. Kuroyanagi, K. Yamada, T. Meshi, S. Tsuda, M. Kondo, M. Nishimura, and I. Hara-Nishimura, *Science*, **305**, 855 (2004). M. Kuroyanagi, K. Yamada, N. Hatsugai, M. Kondo, M. Nishimura, and I. Hara-Nishimura, *J. Biol. Chem.*, **280**, 32914 (2005).	**MCA-3227-v** -20 °C	5 mg
Ac-Leu-Arg-Ser-Arg-MCA Ac-LRSR-MCA (M.W. 729.84) $C_{33}H_{51}N_{11}O_8$ *Substrate for MALTI* P. Niyomrattanakit, S. Yahorava, I. Mutule, F. Muturlis, R. Petrovska, P. Prusis, G. Katzenmeier, and J.E.S. Wikberg, *Biochem. J.*, **397**, 203-211 (2006).	**MCA-3952-PI** -20 °C	5 mg
H-Arg-Arg-Leu-Ile-Glu-Asp-Ala-Glu-Tyr-Ala-Ala-Arg-Gly-NH_2 RRLIEDAEYAARG (M.W. 1519.69) $C_{64}H_{106}N_{22}O_{21}$ [81156-93-6] *Substrate for Protein Tyrosine Kinase (PTK)* J.E. Casnellie, M.L. Harrison, L.J. Pike, K.E. Hellstrom, and E.G. Krebs, *Proc. Natl. Acad. Sci. USA,* **79**, 282 (1982). S.E. Ramer, D.G. Winker, A. Carrera, T.M. Robets, and C.T. Walsh, *Proc. Natl. Acad. Sci. USA*, **88**, 6254, (1991). H.S. Earp, K.S. Austin, G.Y. Gillespie, S.C. Buessow, A.A. Davies, and P.J. Parker, *J. Biol. Chem.*, **260**, 4351 (1985).	**PTK-3956-PI** -20 °C	1 mg 5 mg

PRODUCT	CODE	QTY
H-Arg-Arg-Leu-Ile-Glu-Asp-Ala-Glu-Tyr(H_2PO_3)-Ala-Ala-Arg-Gly-NH_2 RRLIEDAE-pY-AARG (M.W. 1598.69) $C_{64}H_{108}N_{23}O_{23}P$ *Substrate for Protein Tyrosine Phosphatase (PTP)* K.L. Lim, D.S.Y. Lai, M.B. Kalousek, Y. Wang, and C.J. Pallen, *Eur. J. Biochem,* **245**, 693 (1997). V. Bhandari, K. Leong Lim, and C.J. Pallen, *J. Biol. Chem.*, **273**, 8691 (1998). J.J. Perez-Villar, *et al.*, *Molec. Cell. Biol.*, **19**, 2903 (1999).	PTP-3955-PI -20 °C	1 mg 5 mg
Benzoyl-Nle-Lys-Arg-Arg-MCA (M.W.. 833.01) $C_{41}H_{60}N_{12}O_7$ *Dengue Fever Virus Protein Substrate* J. Li, S.P. Lim, D. Beer, V. Patel, D. Wen, C. Tumanut, D.C. Tully, J.A. Williams , J. Jiricek , J.P. Priestle, J.L. Harris, and S.G. Vasudevan, *J. Biol. Chem.*, **280**, 28766 (2005).	MCA-3923-PI -20 °C	5 mg
Dabcyl-γ-Abu-Ile-His-Pro-Phe-His-Leu-Val-Ile-His-Thr-Edans **Renin Substrate I** (Trifluoroacetate Salt) (M.W. 1798.16) $C_{90}H_{120}N_{22}O_{16}S$ [142988-22-5] G.T. Wang, *et al.*, Anal Biochem **210**, 351-9 (1993). N. Nakamura, *et al.*, *J Biochem (Tokyo),* **109**, 741-5 (1991). K. Murakami, *et al.*, Anal Biochem,**110**, 232-9 (1981).	SFQ-3731-PI -20 °C	1 mg 5 mg
H-Glu(Edans)-Pro-Leu-Phe-Ala-Glu-Arg-Lys(Dabcyl)-OH (M.W. 1488.74) $C_{72}H_{97}N_{17}O_{16}S$ *Substrate for Calpain 1*	SFQ-3914-PI -20 °C	1 mg
GnGn-bi-Asn-PABA O-β-2-Acetamido-2-deoxy-D-glucopyranosyl-(1- 2)-O-α-D-mannopyranosyl-(1- 3)-[O-β-2-acetamido-2-deoxy-D-glucopyranosyl-(1-2)-O-α-D-mannopyranosyl-(1-6)]-O-β-D-mannopyranosyl-(1-4)-O-β-2-acetamido-2-deoxy-D-glucopyranosyl-(1-4)-*N*-β-2-acetamido-2-deoxy-D-glucopyranosyl-(1-4)-L-asparagine 4-(2-pyridylamino)butylamide (M.W. 1578.50) $C_{63}H_{103}N_9O_{37}$ *Substrate for GDP-L-Fuc: N-Acetyl-β-D-Glucosaminide α1-6Fucosyltransferase Activity* N. Uozumi, T. Teshima, T. Yamamoto, A. Nishikawa, Y.-E Gao, E. Miyoshi, C.-X. Gao, K. Noda, K.N. Islam, Y. Ihara, S. Fujii, T. Shiba, and N. Taniguchi, *J. Biochem.*,**120**, 385 (1996). (*Original; Semisynthesis & Assay Method*)	SGS23004-s -20 °C	0.1 mg vial
[Nma-Ile-His-Pro-Phe-His-Leu-Val-Ile-His-Thr-Lys(Dnp)-D-Arg-D-Arg-NH_2 (Trifluoroacetate Form) 2-(Methylamino)benzoyl]-L-isoleucyl-L-histidyl-L-prolyl-L-phenylalanyl-L-histidyl-L-leucyl-L-valyl-L-isoleucyl-L-histidyl-L-threonyl-[Nε-(2,4-dinitrophenyl)-L-lysyl]-D-arginyl-D-arginine amide (M.W. 1952.20) $C_{91}H_{134}N_{30}O_{19}$ Synthetic Product *Fluorescence-Quenching Substrate for Human Renin* S. Takahashi, K. Hori, M. Shinbo, K. Hiwatashi, T. Gotoh, and S. Yamada, *Biosci. Biotechnol. Biochem.*,72, 3232 (2008)	SFQ-3229-v -20 °C	1 mg vial
Pyr-Pro-Val-*p*NA L-Pyroglutamyl-L-prolyl-L-valine *p*-nitroanilide (M.W. 445.47) $C_{21}H_{27}N_5O_6$ *Selective Substrate for Human Granulocyte Elastase* J.A. Kramps, Ch. van Twisk and A.C. van der Linden, *Scand. J. Clin. Lab. Investig.*, **43**, 427 (1983). L. Persson, J. Bergström, H. Ito, and A. Gustafsson, *J. Periodontol.*, **72**, 90 (2001). I. Groth and S. Alban, *Planta Med.*, **74**, 852 (2008).	SAP-3228-v -20 °C	5 mg vial
Suc-Ala-Glu-Pro-Phe-*p*NA Suc-AEPF-*p*NA (M.W. 682.69) $C_{32}H_{38}N_6O_{11}$ *Substrate for Peptidyl-prolyl Isomerase (PPIase) Pin1* Z.J. Shen, S. Esnault, and J.S. Malter, *Nat. Immunol.*, **6**, 1280 (2005). S. Esnault, Z.J. Shen, E.Whitesel and J.S. Malter, *J. Immunol.*, **177**, 6999 (2006).	SAP-3947-PI -20 °C	1 mg 5 mg
(Z-Asp-Glu-Val-Asp)$_2$-Rh110 **(Ac-DEVD)$_2$-Rh110** (M.W. 1331.28) $C_{60}H_{70}N_{10}O_{25}$ *J Biol Chem.*, **275**, 288 (2000). *Biochemistry*, **38**, 13906 (1999).	SDR-3727-PI -20 °C	1 mg 5 mg

Enzyme Inhibitors

Galardin™

Peptides International is now offering **Galardin™**, in addition to our widely used enzyme inhibitors.[1] Galardin or GM6001 is a potent, broad-spectrum matrix metalloproteinase (MMP) inhibitor and is a member of the hydroxamate class of inhibitors. We are pleased to add galardin to complement our popular line of TAPI MMP inhibitors.[2] **Pepstatin A** is an aspartic proteinase inhibitor, but its effect on cells is not well defined. A more recent study suggests pepstatin A can also suppress osteoclast differentiation independent of proteinases.[2] **Actinonin** is an inhibitor of aminopeptidase *N* (APN) activity.[3] However, later findings demonstrated it could impressively prevent proliferation of 16 human cancer cell lines, and its administration in animal models blocked human prostrate and lung cancer growth.[4-6] Actinonin's tumor selective characteristics and pepstatin A's role in osteoclast differentiation have increased research interest in both these established inhibitors. *http://pepnet.com/products/enzymeinhibitor.pdf.*

1. J. Gordon, B.K. Kelly, and G.A. Miller, *Nature.* **195**, 701 (1962).
2. K. Darlak, R.B. Miller, M.S. Stack, A.F. Spatola, and R.D. Grey, *J. Biol. Chem.*, **265**, 5199 (1990).
3. D. Grobelny, I. Poncz, and R.E. Galardy, *Biochemistry*, **31**, 7152 (1992).
4. T. Aoyagi, *et al.*, *J. Antibiotics*, **25**, 689 (1972).
5. D.Z. Chen, *et al.*, *Biochemistry*, **39**, 1256 (2000).
6. Y. Xu, *et al.*, *Clin. Cancer Res.,* **4**,171 (1998).
7. M.D. Lee, *et al., J. Clin. Invest.*, **114**, 107 (2004).

Product	Code	Qty
Galardin™ **GM6001, Ilomastat** *N*-[(2R)-2-(Hydroxamidocarbonylmethyl)-4-Methylpentanoyl]-L-Tryptophan Methylamide (M.W. 388.47) $C_{20}H_{28}N_4O_4$ *Inhibitor for Collagenases and MMPs* D. Grobelny, I. Poncz, and R.E. Galardy, *Biochemistry,* **31**, 7152 (1992).	**INH-3927-PI** -20 °C	5 mg

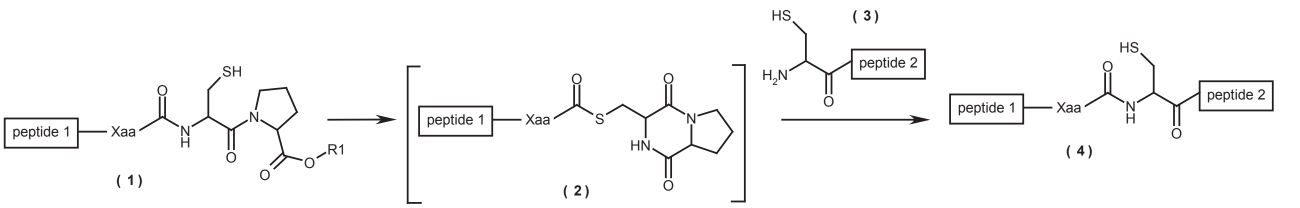
PRODUCT	CODE	QTY

Tools for Peptide Synthesis

Amino Acids

Fmoc-Xaa-Cys(Trt)-OH

A dipeptide, Fmoc-Xaa-Cys(Trt), is a key building block to prepare a peptide having a cysteinyl prolyl ester moiety at the C-terminus (CPE peptide 1). The CPE peptide 1 is spontaneously transformed into the corresponding peptide thioester 2 at the Xaa residue in a neutral buffer solution, and utilized for the synthesis of polypeptide 4 by the reaction with a cysteinyl peptide 3 in an one-pot reaction. Thus, the CPE peptide is a useful alternative to peptide thioester and can be synthesized by the standard Fmoc SPPS employing the dipeptide, Fmoc-Xaa-Cys(Trt).



Fmoc-Ala-Cys(Trt)-OH

FCP-2350 — 1 g — 4 °C

9-Fluorenylmethoxycarbonyl-L-Alanyl-S-Trityl-Cysteine
(M.W. 656.79) $C_{40}H_{36}N_2O_{5S}$
Component of Cysteinyl Prolyl Ester (CPE) Autoactivation Unit

T. Kawakami and S. Aimoto, *Chem. Lett.*, **36**, 76 (2007).
T. Kawakami and S. Aimoto, *Tetrahedron Lett.*, **48**, 1903 (2007).
T. Kawakami and S. Aimoto, *Tetrahedron*, **65**, 3871 (2009).
• This compound is produced by Peptide Institute, Inc. under the license of Osaka University and Osaka Foundation

Fmoc-Gly-Cys(Trt)-OH

FCP-2351 — 1 g — 4 °C

9-Fluorenylmethoxycarbonyl-Glycyl-S-Trityl-Cysteine
(M.W. 642.76) $C_{39}H_{34}N_2O_5S$
Component of Cysteinyl Prolyl Ester (CPE) Autoactivation Unit

T. Kawakami and S. Aimoto, *Chem. Lett.*, **36**, 76 (2007).
T. Kawakami and S. Aimoto, *Tetrahedron Lett.*, **48**, 1903 (2007).
T. Kawakami and S. Aimoto, *Tetrahedron*, **65**, 3871 (2009).
• This compound is produced by Peptide Institute, Inc. under the license of Osaka University and Osaka Foundation

Fmoc-Leu-Cys(Trt)-OH

FCP-2352 — 1 g — 4 °C

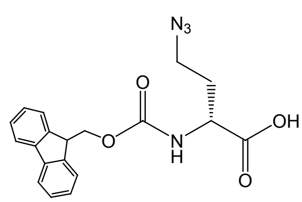
9-Fluorenylmethoxycarbonyl-L-Leucyl-S-Trityl-Cysteine
(M.W. 698.87) $C_{43}H_{42}N_2O_5S$
Component of Cysteinyl Prolyl Ester (CPE) Autoactivation Unit

T. Kawakami and S. Aimoto, *Chem. Lett.*, **36**, 76 (2007).
T. Kawakami and S. Aimoto, *Tetrahedron Lett.*, **48**, 1903 (2007).
T. Kawakami and S. Aimoto, *Tetrahedron*, **65**, 3871 (2009).
• This compound is produced by Peptide Institute, Inc. under the license of Osaka University and Osaka Foundation

Fmoc-D-Dab(N_3)-OH

FDX-53107-PI — 1 g, 5 g, 25 g — 4 °C

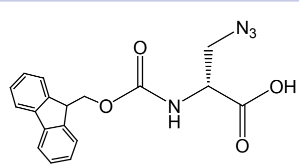
Fmoc-(R)-2-Amino-4-Azidobutanoic Acid
(M.W. 366.4)



Fmoc-D-Dap(N_3)-OH

FDX-53106-PI — 1 g, 5 g, 25 g — 4 °C

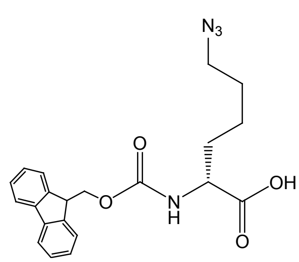
Fmoc-(R)-2-Amino-3-Azidopropanoic Acid
(M.W. 352.3)
[1016163-79-3]

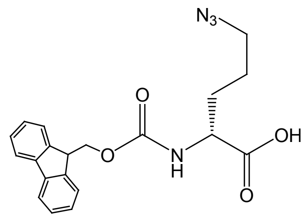
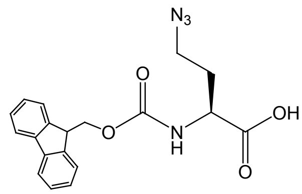
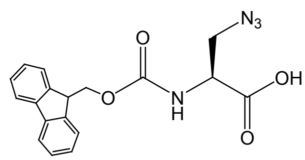
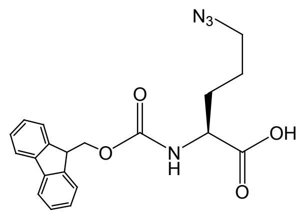


Fmoc-D-Lys(N_3)-OH

FDK-53109-PI — 1 g, 5 g, 25 g — 4 °C

Fmoc-(R)-2-Amino-6-Azidohexanoic Acid
(M.W. 394.4)
[1198791-53-5]



PRODUCT		CODE	QTY
Fmoc-D-Orn(N_3)-OH Fmoc-(R)-2-Amino-5-Azidopentanoic Acid (M.W. 380.4) [1176270-25-9]		FDO-53108-PI 4 °C	1 g 5 g 25 g
Fmoc-Dab(N_3)-OH Fmoc-(S)-2-Amino-4-Azidobutanoic Acid (M.W. 366.4) [942518-20-9]		FLX-53103-PI 4 °C	1 g 5 g 25 g
Fmoc-Dap(N_3)-OH Fmoc-(S)-2-Amino-3-Azidopropanoic Acid (M.W. 352.3) [684270-46-0]		FLX-53102-PI 4 °C	1 g 5 g 25 g
Fmoc-Orn(N_3)-OH Fmoc-(S)-2-Amino-5-Azidopentanoic Acid (M.W. 380.4) [1097192-04-5]		FLO-53104-PI 4 °C	1 g 5 g 25 g

PRODUCT	CODE	QTY

Resins

H-D-Ala-2-ClTrt Resin
Divinylbenzene 1%, 100-200 mesh

RHA-11077-PI — 4 °C — 1 g, 5 g

Fmoc-D-Glu(OtBu)-Wang Resin
Divinylbenzene 1%, 100-200 mesh

RFE-1358-PI — 4 °C — 1 g, 5 g

Reagents

COMU

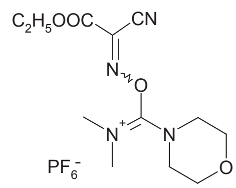
(1-[1-(**C**yano-2-ethoxy-2-**O**xoethylideneaminooxy)-Dimethylamino-**M**orpholino]-**U**ronium Hexafluorophosphate) allows for the use of one equivalent of base during the coupling protocol, thus contributing to the reduction of potential racemization in the growing peptide chain without impairing the reaction rate or the overall yield of the coupling process. Additionally, COMU is highly soluble in DMF and NMP, safe, and non-allergenic, which makes it a compelling reagent alternative.

COMU Reagent

KCM-1015-PI — 4 °C — 5 g, 25 g, 100 g

1-[1-(**C**yano-2-ethoxy-2-**O**xoethylideneaminooxy)-Dimethylamino-**M**orpholino]-**U**ronium Hexafluorophosphate
(M.W. 428.27) $C_{12}H_{19}N_4O_4PF_6$ [1075198-30-9]
Coupling Reagent
COMU allows for the use of one equivalent of base during the coupling protocol, thus contributing to the reduction of potential racemization in the growing peptide chain without impairing the reaction rate or the overall yield of the coupling process.

A. El-Faham and F.Albericio, *J. Org. Chem.*, **73**, 2731 (2008).
A.El-Faham, *et al.*, Poster P10103-039 presented at the 30th EPS, Helsinki, 2008).



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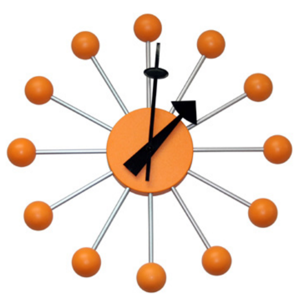
PyClocK® can not react with the free amine function and therefore does not terminate the growing peptide as the aminium salts do, through the formation of guanidine derivatives. Thus, **PyClocK** is especially useful for slow coupling reactions and could be used in excess to assure complete activation of the carboxylic function. For additional information and updates, please visit: *http://www.pepnet.com/products/pyclock.pdf*



SYNTHESIS ON HINDERED DERIVATIVES OF LEU-ENKEPHALINAMIDE			
	PyClocK®	PyBOP®	PyAOP®
H-Tyr-Aib-Aib-Phe-Leu-NH_2	97.24	85.11	99.47
Impurity: H-Tyr-Aib-Phe-Leu-NH_2	2.76	14.89	0.53

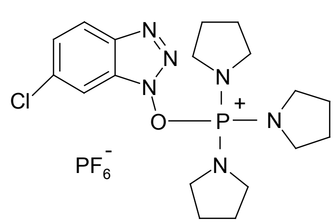
Stability: PyBOP® > PyClocK® > PyAOP®
Reactivity: PyAOP® > PyClocK® > PyBOP®

1. O. Marder. F. Albericio, *Chimica Oggi*, **21**, 6 (2003).
PyClocK® is a proprietary product of Luxembourg Industries Ltd.
PyBOP® is a registered trademaek of Merck Biosciences AG.
PyAOP® is a registered trademaek of Applied BioSystems.

PyClocK®

KPC-1016-PI — -20 °C — 5 g, 25 g

6-Chloro-Benzotriazole-1-yl-oxy-tris-Pyrrolidino-Phosphonium Hexafluorophosphate
(M.W. 554.85) $C_{18}H_{27}N_6OF_6ClP_2$
Coupling Reagent for Peptide Synthesis



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