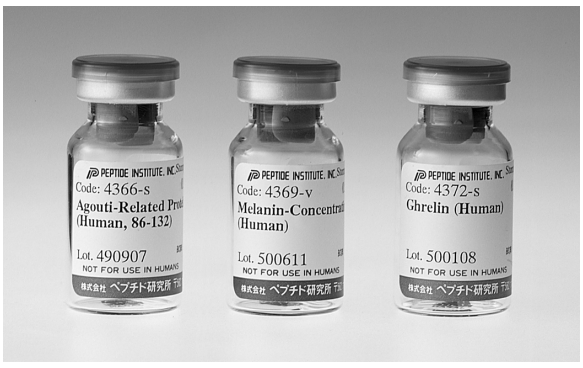
Biologically Active Peptides and Proteins



Biologically Active Peptides

Biologically active peptides listed in this section are chemically synthesized and rigorously subjected to independent purity testing. They are fully guaranteed according to our Purity Criteria on page IV (XVI).

Ac-Asp-Glu

Code	Compound			Price:Yen
4167	**Ac-Asp-Glu**	Bulk	25 mg	4,800
-20℃	(M.W. 304.25) $C_{11}H_{16}N_2O_8$ [3106-85-2]		100 mg	13,500
	Endogenous Excitatory Neurotransmitter			

1) K.L. Reichert and F. Fonnum, *J. Neurochem.*, **16**, 1409 (1969). *(Original)*
2) K.J. Koller and J.T. Coyle, *Eur. J. Pharmacol.*, **98**, 193 (1984). *(Characterization of Receptor)*
3) K.J. Koller, R. Zaczek, and J.T. Coyle, *J. Neurochem.*, **43**, 1136 (1984). *(Localization in Brain)*
4) J.H. Neale, T. Bzdega, and B. Wroblewska, *J. Neurochem.*, **75**, 443 (2000). (*Review*)

Adjuvant Peptide

4031-v	**Adjuvant Peptide**	Vial	0.5 mg	3,500
-20℃	*N*-Ac-Mur-Ala-D-Glu-NH_2			
	(Mur: Muramic acid)			
	(M.W. 492.48) $C_{19}H_{32}N_4O_{11}$ [53678-77-6]			
4031	**Adjuvant Peptide**	Bulk	25 mg	70,000
-20℃	*N*-Ac-Mur-Ala-D-Glu-NH_2 • $2H_2O$			
	(Mur: Muramic acid)			
	(M.W. 492.48 • 36.03) $C_{19}H_{32}N_4O_{11}$ • $2H_2O$ [53678-77-6]			
	Muramyl Dipeptide			

1) F. Ellouz, A. Adam, R. Ciorbaru, and E. Lederer, *Biochem. Biophys. Res. Commun.*, **59**, 1317 (1974). *(Original)*
2) S. Kotani, Y. Watanabe, F. Kinoshita, T. Shimono, I. Morisaki, T. Shiba, S. Kusumoto, Y. Tarumi, and K. Ikenaka, *Biken J.*, **18**, 105 (1975). *(Chem. Synthesis & Immun. Activity)*

Adrenocorticotropic Hormone (ACTH)

4109-v	**ACTH (Human, 1-24)**	Vial	0.5 mg	18,000
-20℃	**Adrenocorticotropic Hormone (Human, 1-24)**			
	Ser-Tyr-Ser-Met-Glu-His-Phe-Arg-Trp-Gly-Lys-Pro-Val-Gly-Lys-Lys-Arg-Arg-Pro-Val-Lys-Val-Tyr-Pro			
	(M.W. 2933.4) $C_{136}H_{210}N_{40}O_{31}S$ [16960-16-0]			

1) B. Riniker, P. Sieber, W. Rittel, and H. Zuber, *Nature (New Biol.)*, **235**,114 (1972). *(Original; Structure)*

1) K. Kitamura, K. Kangawa, H. Matsuo, and T. Eto, *Drugs*, **49**, 485 (1995). (*Review*)
2) D.A. Schell, R.C. Vari, and W.K. Samson, *Trends Endocrinol. Metab.*, **7**, 7 (1996). *(Review)*
3) M. Julián, M. Cacho, M.A. García, S. Martín-Santamaría, B. de Pascual-Teresa, A. Ramos, A. Martínez, and F. Cuttitta, *Eur. J. Med. Chem.*, **40**, 737 (2005). (*Review*)

Code	Compound			Price:Yen
4278-s -20℃	**Adrenomedullin (Human)***	Vial	0.1 mg	28,000

Tyr-Arg-Gln-Ser-Met-Asn-Asn-Phe-Gln-Gly-Leu-Arg-Ser-Phe-Gly-Cys-Arg-Phe-Gly-Thr-Cys-Thr-Val-Gln-Lys-Leu-Ala-His-Gln-Ile-Tyr-Gln-Phe-Thr-Asp-Lys-Asp-Lys-Asp-Asn-Val-Ala-Pro-Arg-Ser-Lys-Ile-Ser-Pro-Gln-Gly-Tyr-NH_2

(Disulfide bond between Cys^{16}-Cys^{21})

(M.W. 6028.7) $C_{264}H_{406}N_{80}O_{77}S_3$ [148498-78-6]

Hypotensive Peptide

1) K. Kitamura, K. Kangawa, M. Kawamoto, Y. Ichiki, S. Nakamura, H. Matsuo, and T. Eto, *Biochem. Biophys. Res. Commun.*, **192**, 553 (1993). *(Original)*
2) K. Kitamura, J. Sakata, K. Kangawa, M. Kojima, H. Matsuo, and T. Eto, *Biochem. Biophys. Res. Commun.*, **194**, 720 (1993). *(Original; cDNA)*

4325-v -20℃	**Adrenomedullin (Human, 1-25)***	Vial	0.5 mg	25,000

Tyr-Arg-Gln-Ser-Met-Asn-Asn-Phe-Gln-Gly-Leu-Arg-Ser-Phe-Gly-Cys-Arg-Phe-Gly-Thr-Cys-Thr-Val-Gln-Lys

(Disulfide bond between Cys^{16}-Cys^{21})

(M.W. 2927.3) $C_{125}H_{192}N_{40}O_{36}S_3$

Vasopressor Fragment of Human Adrenomedullin

1) T.X. Watanabe, Y. Itahara, T. Inui, K. Yoshizawa-Kumagaye, K. Nakajima, and S. Sakakibara, *Biochem. Biophys. Res. Commun.*, **219**, 59 (1996). *(Original)*

4302-v -20℃	**Adrenomedullin (Human, 22-52)**	Vial	0.5 mg	25,000

Thr-Val-Gln-Lys-Leu-Ala-His-Gln-Ile-Tyr-Gln-Phe-Thr-Asp-Lys-Asp-Lys-Asp-Asn-Val-Ala-Pro-Arg-Ser-Lys-Ile-Ser-Pro-Gln-Gly-Tyr-NH_2

(M.W. 3576.0) $C_{159}H_{252}N_{46}O_{48}$ [159899-65-7]

Adrenomedullin Antagonist

1) S. Eguchi, Y. Hirata, H. Iwasaki, K. Sato, T.X. Watanabe, T. Inui, K. Nakajima, S. Sakakibara, and F. Marumo, *Endocrinology*, **135**, 2454 (1994). *(Original)*
2) J. Penchalaneni, S. J. Wimalawansa, and C. Yallampalli, *Biol. Reprod.*, **71**, 1475 (2004). (*Pharmacol.*)

4281-s -20℃	**Adrenomedullin (Rat)***	Vial	0.1 mg	28,000

Tyr-Arg-Gln-Ser-Met-Asn-Gln-Gly-Ser-Arg-Ser-Thr-Gly-Cys-Arg-Phe-Gly-Thr-Cys-Thr-Met-Gln-Lys-Leu-Ala-His-Gln-Ile-Tyr-Gln-Phe-Thr-Asp-Lys-Asp-Lys-Asp-Gly-Met-Ala-Pro-Arg-Asn-Lys-Ile-Ser-Pro-Gln-Gly-Tyr-NH_2

(Disulfide bond between Cys^{14}-Cys^{19})

(M.W. 5729.4) $C_{242}H_{381}N_{77}O_{75}S_5$

Hypotensive Peptide

1) J. Sakata, T. Shimokubo, K. Kitamura, S. Nakamura, K. Kangawa, H. Matsuo, and T. Eto, *Biochem. Biophys. Res. Commun.*, **195**, 921 (1993). (*Original; cDNA & Biological Activity*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Adrenomedullin and Related Peptides (continued)

Code	Compound			Price:Yen
4421-s -20℃	**Adrenomedullin 2 / Intermedin (Human)** Thr-Gln-Ala-Gln-Leu-Leu-Arg-Val-Gly-Cys-Val-Leu-Gly-Thr-Cys-Gln-Val-Gln-Asn-Leu-Ser-His-Arg-Leu-Trp-Gln-Leu-Met-Gly-Pro-Ala-Gly-Arg-Gln-Asp-Ser-Ala-Pro-Val-Asp-Pro-Ser-Ser-Pro-His-Ser-Tyr-NH_2 (Disulfide bond between Cys^{10} and Cys^{15}) (M.W. 5100.7) $C_{219}H_{349}N_{69}O_{66}S_3$ *Cardiovascular and Renal Regulator / Suppressor for Food Intake and Gastric Emptying*	Vial	0.1 mg	24,000
4422-s -20℃	**Adrenomedullin 2 / Intermedin (Rat)** Pro-His-Ala-Gln-Leu-Leu-Arg-Val-Gly-Cys-Val-Leu-Gly-Thr-Cys-Gln-Val-Gln-Asn-Leu-Ser-His-Arg-Leu-Trp-Gln-Leu-Val-Arg-Pro-Ser-Gly-Arg-Arg-Asp-Ser-Ala-Pro-Val-Asp-Pro-Ser-Ser-Pro-His-Ser-Tyr-NH_2 (Disulfide bond between Cys^{10} and Cys^{15}) (M.W. 5216.9) $C_{226}H_{361}N_{75}O_{64}S_2$ *Cardiovascular and Renal Regulator / Suppressor for Food Intake and Gastric Emptying*	Vial	0.1 mg	24,000

Five adrenomedullins (AM1-5) were cloned and identified from the pufferfish, *Takifugu rubripes*. Three of these [AM1/4/5] are counterparts of well-known mammalian adrenomedullins (AM) (Code 4278-s and 4281-s), but the other two peptides [AM2/3] were unidentified in mammals[1]. Next, Takei and coworkers attempted to detect cDNA encoding mammalian peptides corresponding to the already identified adrenomedullins in pufferfish. As a result, they successfully discovered human and rat **adrenomedullin 2** (**AM2**) as a 47-residue peptide with 6 amino acid divergence[2]. Another group, Roh and coworkers, utilized a phylogenetic profiling approach to analyze GenBank databases, which led them to identify human and rat intermedin (IMD); 47 amino acid peptides of these species (IMDL, named after long form of intermedin)[3], which is identical to **AM2** . They also predicted IMDS (IMD short) as another possible product processed at single Arg-residue, located at 7 amino acid residue downstream of the amino-terminus of IMDL.

The synthetic cognate peptides of **AM2** and two types of IMD showed the following biological activities: **i)** dose-dependent hypotensive effects at doses between 0.1-10 nmol/kg in mice (**AM2**) and at 10 and 50 nM in normal and SHR rats (IMD), respectively, the efficacy of **AM2** in mice seems to be higher than that of AM, **ii)** antidiuretic and antinatriuretic activities in mice (**AM2**), and **iii)** anorexic activity in fasted mice through gastric emptying suppression (IMD). It has been suggested that these activities may be regulated through its own specific receptor or through shared calcitonin receptor-like receptor (CRLR) and related proteins, such as receptor activity modifying protein (RAMP) complexes. The effects of **AM2** on renal hemodynamics and urine formation in rats have been reported[4]. Later, the effects of **AM2**/IMD within central nervous system[5] and immunocytochemical localization in human[6] were reported.

1) M. Ogoshi, K. Inoue, and Y. Takei, *Biochem. Biophys. Res. Commun.*, **311**, 1072 (2003). (*Takifugu rubripes Adrenomedullins*)
2) Y. Takei, K. Inoue, M. Ogoshi, T. Kawahara, H. Bannai, and S. Miyano, *FEBS Lett.*, **556**, 53 (2004). (*Original; Adrenomedullin 2*)
3) J. Roh, C.L. Chang, A. Bhalla, C. Klein, and S.Y.T. Hsu, *J. Biol. Chem.*, **279**, 7264 (2004). (*Original; Intermedin*)
4) Y. Fujisawa, Y. Nagai, A. Miyatake, Y. Takei, K. Miura, T. Shoukouji, A. Nishiyama, S. Kim ura, and Y. Abe, *Eur. J. Pharmacol.*, **497**, 75 (2004). (*Pharmacol.*)
5) M.M. Taylor, S.L. Bagley, and W.K. Samson, *Am. J. Physiol. Regul. Integr. Comp. Physiol.*, **288**, R919 (2005). (*Pharmacol.*)
6) K. Takahashi, K. Kikuchi, Y. Maruyama, T. Urabe, K. Nakajima, H. Sasano, Y. Imai, O. Murakami, and K. Totsune, *Peptides*, **27**, 1383 (2006). (*Histochem.*)
7) D. Bell and B.J. McDermott, *Br. J. Pharmacol.*, **153**, S247 (2008). (*Review*)

Code	Compound			Price:Yen
4291-v -20℃	**PAMP (Human)** **Proadrenomedullin N-terminal 20 Peptide (Human)** Ala-Arg-Leu-Asp-Val-Ala-Ser-Glu-Phe-Arg- Lys-Lys-Trp-Asn-Lys-Trp-Ala-Leu-Ser-Arg-NH_2 (M.W. 2460.8) $C_{112}H_{178}N_{36}O_{27}$ [150238-87-2] *Hypotensive Peptide* 1) K. Kitamura, J. Sakata, K. Kangawa, M. Kojima, H. Matsuo, and T. Eto, *Biochem. Biophys. Res. Commun.*, **194**, 720 (1993). (*Original; cDNA*) 2) H. Washimine, K. Kitamura, Y. Ichiki, Y. Yamamoto, K. Kangawa, H. Matsuo, and T. Eto, *Biochem. Biophys. Res. Commun.*, **202**, 1081 (1994). (*Distribution in Human Tissue*) 3) K. Kitamura, K. Kangawa, Y. Ishiyama, H. Washimine, Y. Ichiki, M. Kawamoto, N. Minamino, H. Matsuo, and T. Eto, *FEBS Lett.*, **351**, 35 (1994). (*Pharmacol.*) 4) F. Katoh, K. Kitamura, H. Niina, R. Yamamoto, H. Washimine, K. Kangawa, Y. Yamamoto, H. Kobayashi, T. Eto, and A. Wada, *J. Neurochem.*, **64**, 459 (1995). (*Pharmacol.*) • This product is distributed under the license of Shionogi & Co., Ltd. Its use for any purpose other than research is strictly prohibited.	Vial	0.5 mg	21,000
4292-v -20℃	**PAMP (Rat)** **Proadrenomedullin N-terminal 20 Peptide (Rat)** Ala-Arg-Leu-Asp-Thr-Ser-Ser-Gln-Phe-Arg- Lys-Lys-Trp-Asn-Lys-Trp-Ala-Leu-Ser-Arg-NH_2 (M.W. 2477.8) $C_{111}H_{177}N_{37}O_{28}$ *Hypotensive Peptide* 1) J. Sakata, T. Shimokubo, K. Kitamura, S. Nakamura, K. Kangawa, H. Matsuo, and T. Eto, *Biochem. Biophys. Res. Commun.*, **195**, 921 (1993). (*Original; cDNA*)	Vial	0.5 mg	21,000
4339-v -20℃	**PAMP-12 (Human)** **Proadrenomedullin N-terminal 20 Peptide (Human, 9-20)** Phe-Arg-Lys-Lys-Trp-Asn-Lys-Trp-Ala-Leu- Ser-Arg-NH_2 (M.W. 1618.9) $C_{77}H_{119}N_{25}O_{14}$ *Hypotensive Peptide / Major Endogenous Form of PAMP* 1) K. Kuwasato, K. Kitamura, Y. Ishiyama, H. Washimine, J. Kato, K. Kangawa, and T. Eto, *FEBS Lett.*, **414**, 105 (1997). (*Original*)	Vial	0.5 mg	8,000

List of Adrenomedullin and Related Peptides

	Code	Compound	Quantity	Price: Yen	Page
Adrenomedullin					
	4278-s	**Adrenomedullin (Human)**	0.1 mg vial	28,000	3
	4302-v	**Adrenomedullin (Human, 22-52)**★1	0.5 mg vial	25,000	3
	4325-v	**Adrenomedullin (Human, 1-25)**★2	0.5 mg vial	25,000	3
	4281-s	**Adrenomedullin (Rat)**	0.1 mg vial	28,000	3
	4421-s	**Adrenomedullin 2 / Intermedin (Human)**	0.1 mg vial	24,000	4
	4422-s	**Adrenomedullin 2 / Intermedin (Rat)**	0.1 mg vial	24,000	4
PAMP					
	4291-v	**PAMP (Human)**	0.5 mg vial	21,000	above
	4292-v	**PAMP (Rat)**	0.5 mg vial	21,000	above
	4339-v	**PAMP-12 (Human)**	0.5 mg vial	8,000	above
CGRP					
	4160-s	**CGRP (Human)**	0.1 mg vial	11,500	34
	4160-v	**CGRP (Human)**	0.5 mg vial	35,000	34
	4232-v	**CGRP (Human, 8-37)**★1	0.5 mg vial	22,000	34
	4163-s	**CGRP (Rat)**	0.1 mg vial	11,500	35
	4163-v	**CGRP (Rat)**	0.5 mg vial	35,000	35
Amylin					
	4219-v	**Amylin (Human)**	0.5 mg vial	41,000	10
	4220-v	**Amylin (Rat)**	0.5 mg vial	38,000	10

★1: Antagonist, ★2: Vasopressor Fragment

Adropin

Code	Compound			Price:Yen
4456-s New -20℃	**Adropin (Human, 34-76)** **(Rat, Mouse)** 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 (Disulfide bond between Cys^{34}-Cys^{56}) (M.W. 4499.8) $C_{190}H_{293}N_{55}O_{68}S_2$	Vial	0.1 mg	25,000

Regulatory Factor in Energy Homeostasis

Peptides secreted from peripheral organs regulate lipid metabolism in key insulin-target tissues and are important for energy homeostasis and maintaining insulin sensitivity. Much attention has been given to adipokines secreted by adipocytes. While receiving less attention, liver-secreted factors are also critical for energy homeostasis.

Adropin, initially identified during microarray analysis of liver gene expression in mouse models of obesity, is a 76-residue peptide encoded by the energy homeostasis associated gene *Enho*[1]. Bioinformatics analysis suggested **adropin (34-76)** being a secreted form of adropin with high probability. Thus disulfide-linked **adropin (34-76)** was chemically synthesized for biological tests; glucose homeostasis and hepatic lipid metabolism were improved in mouse with 90 or 900 nmol/kg/day through intraperitoneal administration. These effects were independent of adiposity or food intake. Considering the alteration of adropin mRNA level associated with obesity, **adropin (34-76)** may be a powerful peptide in the study of obesity-associated hepatosteatosis and hyperinsulinemia.

1) 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, J.M. Stephens, and A.A. Butler, *Cell Metab.*, **8**, 468 (2008). (*Original: Primary Structure / Pharmacol.*)

ω-Agatoxins

1) B.M. Olivera, G.P. Miljanich, J. Ramachandran, and M.E. Adams, *Annu. Rev. Biochem.*, **63**, 823 (1994). (*Review*)
2) O.D. Uchitel, *Toxicon*, **35**, 1161 (1997). (*Review*)

Code	Compound			Price:Yen
4256-s -20℃	**ω-Agatoxin IVA** **ω-Aga-IVA** **(Funnel Web Spider, *Agelenopsis aperta*)** 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. 5202.2) $C_{217}H_{360}N_{68}O_{60}S_{10}$	Vial	0.1 mg	30,000

P-type Ca^{2+} Channel Selective Blocker

1) I.M. Mintz, V.J. Venema, K.M. Swiderek, T.D. Lee, B.P. Bean, and M.E. Adams, *Nature*, **355**, 827 (1992). (*Original*)
2) T.J. Turner, M.E. Adams, and K. Dunlap, *Science*, **258**, 310 (1992). (*Pharmacol.*)
3) 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*)

- This compound is distributed through Peptide Institute, Inc. The customers in the U.S.A. may order this compound through Peptides International, Inc. under their license agreement with the University of Utah.

ω-Agatoxins (continued)

Code	Compound			Price:Yen
4294-s -20℃	**ω-Agatoxin TK** **ω-Aga-TK** **ω-Aga-IVB** **(Funnel Web Spider, *Agelenopsis aperta*)** Glu-Asp-Asn-Cys-Ile-Ala-Glu-Asp-Tyr-Gly- Lys-Cys-Thr-Trp-Gly-Gly-Thr-Lys-Cys-Cys- Arg-Gly-Arg-Pro-Cys-Arg-Cys-Ser-Met-Ile- Gly-Thr-Asn-Cys-Glu-Cys-Thr-Pro-Arg-Leu- Ile-Met-Glu-Gly-Leu-D-Ser-Phe-Ala (Reported disulfide bonds between Cys^{4}-Cys^{20}, Cys^{12}-Cys^{25}, Cys^{19}-Cys^{36}, and Cys^{27}-Cys^{34}) (M.W. 5273.0) $C_{215}H_{337}N_{65}O_{70}S_{10}$ [145017-83-0] Purity Information : QE See page IV (XVI) *P-type Ca^{2+} Channel Blocker* 1) M. Kuwada, T. Teramoto, K.Y. Kumagaye, K. Nakajima, T. Watanabe, T. Kawai, Y. Kawakami, T. Niidome, K. Sawada, Y. Nishizawa, and K. Katayama, *Mol. Pharmacol.*, **46**, 587 (1994). (*Original; ω-Aga-TK*) 2) Y. Shikata, T. Watanabe, T. Teramoto, A. Inoue, Y. Kawakami, Y. Nishizawa, K. Katayama, and M. Kuwada, *J. Biol. Chem.*, **270**, 16719 (1995). (*L-Ser to D-Ser Isomerase*) 3) M.E. Adams, I.M. Mintz, M.D. Reily, V. Thanabal, and B.P. Bean, *Mol. Pharmacol.*, **38**, 681 (1990). (*Original; ω-Aga-IVB*) 4) S.D. Heck, P.R. Kelbaugh, M.E. Kelly, P.F. Thadeio, N.A. Saccomano, J.G Stroh. and R.A. Volkmann, *J. Am. Chem. Soc.*, **116**, 10426 (1994). (*S-S Bond; ω-Aga-IVB*) 5) T. Teramoto, T. Niidome, M. Kimura, M. Ohgoh, Y. Nishizawa, K. Katayama, T. Mayumi, and K. Sawada, *Brain Res.*, **756**, 225 (1997). (*Pharmacol.*) 6) S.P. Lieske and J.-M. Ramirez, *J. Neurophysiol.*, **95**, 1323 (2006). (*Pharmacol.*) • This product is distributed under the license of Eisai Co., Ltd. Its use for any purpose other than research is strictly prohibited.	Vial	0.1 mg	30,000
3402-s New -20℃	**Biotinyl-ω-Agatoxin IVA** **Biotinyl-ω-Aga-IVA** (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* 1) 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*) 2) S. Nakanishi, A. Fujii, T. Kimura, S. Sakakibara, and K. Mikoshiba, *J. Neurosci. Res.*, **41**, 532 (1995). (*Biochem.: Distribution of Binding Sites*)	Vial	0.1 mg	35,000

Agelenin

Code	Compound			Price:Yen
4247-s -20℃	**Agelenin** **(Spider, *Agelena opulenta*)** Gly-Gly-Cys-Leu-Pro-His-Asn-Arg-Phe-Cys-Asn-Ala-Leu-Ser-Gly-Pro-Arg-Cys-Cys-Ser-Gly-Leu-Lys-Cys-Lys-Glu-Leu-Ser-Ile-Trp-Asp-Ser-Arg-Cys-Leu-NH_2 (Disulfide bonds between Cys^{3}-Cys^{19}, Cys^{10}-Cys^{24}, and Cys^{18}-Cys^{34}) (M.W. 3818.4) $C_{160}H_{254}N_{52}O_{45}S_6$ *Presynaptic Ca^{2+} Channel Antagonist*	Vial	0.1 mg	30,000

1) K. Hagiwara, T. Sakai, A. Miwa, N. Kawai, and T. Nakajima, *Biomed. Res.*, **11**, 181 (1990). (*Original*)
2) T. Inui, K. Hagiwara, K. Nakajima, T. Kimura, T. Nakajima, and S. Sakakibara, *Pept. Res.*, **5**, 140 (1992). (*Chem. Synthesis, S-S Bond & Amide*)
3) N. Yamaji, K. Sugase, T. Nakajima, T. Miki, M. Wakamori, Y. Mori, and T. Iwashita, *FEBS Lett.*, **581**, 3789 (2007). (*Solution Structure*)

Agouti-Related Protein

Code	Compound			Price:Yen
4366-s -20℃	**Agouti-Related Protein (Human, 86-132)** **AGRP (Human, 86-132)** Arg-Cys-Val-Arg-Leu-His-Glu-Ser-Cys-Leu-Gly-Gln-Gln-Val-Pro-Cys-Cys-Asp-Pro-Cys-Ala-Thr-Cys-Tyr-Cys-Arg-Phe-Phe-Asn-Ala-Phe-Cys-Tyr-Cys-Arg-Lys-Leu-Gly-Thr-Ala-Met-Asn-Pro-Cys-Ser-Arg-Thr (Reported disulfide bonds between Cys^{87}-Cys^{102}, Cys^{94}-Cys^{108}, Cys^{101}-Cys^{119}, Cys^{105}-Cys^{129}, and Cys^{110}-Cys^{117}) (M.W. 5347.2) $C_{223}H_{339}N_{69}O_{63}S_{11}$ *Melanocortin Receptor-3 / 4 Antagonist, Appetite Boosting Peptide*	Vial	0.1 mg	30,000

A gene encoding **agouti-related protein** (**AGRP**) was isolated in 1997 during a search of the proteins related to agouti protein which was known to affect pigmentation through the melanocortin receptor 1 (MC-1). **AGRP** shows some sequence similarity to agouti protein, including the distribution of the 10 cysteine residues in the C-terminal domain. However, **AGRP** and agouti protein bind to distinct types of melanocortin receptors. The receptors for **AGRP** are reported to be MC-3 and MC-4, which are known to participate in the regulation of feeding, whereby the binding of an antagonist like **AGRP** stimulates food intake. Some groups have attempted to identify the active domain of a 132 amino acid precursor protein, one of which is **AGRP(86-132)**[1]. IC_{50} values of this peptide in the competitive binding assay for MC-3 and MC-4, expressed in human embryonic kidney cells, were 2 nM and 19 nM, respectively. Competitive inhibition of α-MSH-stimulated cAMP production was also detected for MC-3 and MC-4, but not for MC-1 and MC-5, indicating the selective nature of the action of **AGRP(86-132)** with respect to melanocortin receptors.

1) R.D. Rosenfeld, L. Zeni, A.A. Welcher, L.O. Narhi, C. Hale, J. Marasco, J. Delaney, T. Gleason, J.S. Philo, V. Katta, J. Hui, J. Baumgartner, M. Graham, K.L. Stark, and W. Karbon, *Biochemistry*, **37**, 16041 (1998). (*Original*)
2) E.J. Bures, J.O. Hui, Y. Young, D.T. Chow, V. Katta, M.F. Rohde, L. Zeni, R.D. Rosenfeld, K.L. Stark, and M. Haniu, *Biochemistry*, **37**, 12172 (1998). (*Structure; S-S Bond*)
3) J.R. Shutter, M. Graham, A.C. Kinsey, S. Scully, R. Lüthy, and K.L. Stark, *Genes Dev.*, **11**, 593 (1997). (*Agouti-Related Transcript Sequence*)
4) D.M. Dinulescu and R.D. Cone, *J. Biol. Chem.*, **275**, 6695 (2000). (*Review*)
5) A.M. Wilczynski, C.G. Joseph, and C. Haskell-Luevano, *Med. Res. Rev.*, **25**, 545 (2005). (*Review*)
6) O. Ilnytska and G. Argyropoulos, *Cell. Mol. Life Sci.*, **65**, 2721 (2008). (*Review*)

Ala-Arg-Gly-Ile-Lys-Gly-Ile-Arg-Gly-Phe-Ser-Gly [Lysine Hydroxylase Substrate L-1] See Code 4166 on page 208

Alarin

Code	Compound			Price:Yen
4449-s -20℃	**Alarin (Human)** 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 (M.W. 2894.3) $C_{127}H_{205}N_{43}O_{35}$ [909409-86-5] *Splice Variant of Galanin-Like Peptide*	Vial	0.1 mg	10,000

Human galanin [Code 4245-v] and galanin-like peptide (GALP) [Code 4391-s], are members of the galanin peptide family. Galanin (1-13) is identical to (9-21) of GALP, so it is not surprising that both peptides interact with galanin receptors 1-3 with some subtype specificity[1].

Galanin: GWTLNSAGYLLGPHAVGNHRSFSDKNGLTS
GALP: APAHRGRGGWTLNSAGYLLGPVLHLPQMGDQDGKRETALEILDLWKAIDGLPYSHPPQPS
Alarin: APAHRSSTFPKWVTKTERGRQPLRS

GALP is a 60 amino acid residue peptide, which is encoded by its gene comprised of 6 exons. In 2007, a splicing variant of GALP was identified in human neuroblastic tumors[2] and later in mouse. The identified peptide, termed "**alarin**", is based on the amino-terminal Ala and the carboxyl-terminal Ser residues in the primary structure, which comprises 25 amino acid residues[3]. Primary structure of **alarin** (1-5) is the same as that of GALP (1-5) (encoded by exon 2), which follows the 20 amino acid residue peptide from exon 4, thus, exon 3 is excluded from the **alarin** transcript.

Alarin immunoreactivity is detected in pericytes and venules in human dermis, but not in endothelial cells of blood vessels. **Alarin** is reported to inhibit inflammatory edema induced by substance P and CGRP at doses in the picomolar range in mouse, which is a characteristic feature also observed in galanin and GALP. The mechanism of **alarin**-eliciting inhibitory activity is considered to be decreased in cutaneous blood flow because **alarin** did not affect microvascular permeability or vasoconstricting activity of endothelin-1. **Alarin** fails to interact with galanin receptors, as expected, since the **alarin** transcript lacks the GALP (9-21)-encoding exon 3, suggesting that a specific receptor for **alarin** may exist in the body.

In conjunction with galanin and GALP, **alarin** might be an essential tool for vascular systems research.

* Note: In the literature[3], the carboxyl-terminal structure of **alarin** is not definitely described, therefore, we synthesize the 25 amino acid residue peptide with the free- carboxyl-terminus based on the reported sequence in the GenBank database (DQ155644) and distribute it as **alarin**.

1) R. Lang, A.L. Gundlach, and B. Kofler, *Pharmacol. Ther.*, **115**, 177 (2007). (*Review*)
2) 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*)
3) 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). (*Original.*)

1) G.J.S. Cooper, *Endocrinol. Rev.*, **15**, 163 (1994). (*Review*)
2) J.W.M. Höppener, B. Ahrén, and C.J.M. Lips, *N. Engl. J. Med.*, **343**, 411 (2000). (*Review*)
3) S.A. Jayasinghe and R. Langen, *Biochim. Biophys. Acta*, **1768**, 2002 (2007). (*Review*)
4) L. Haataja, T. Gurlo, C.J. Huang, and P.C. Butler, *Endocr. Rev.*, **29**, 303 (2008). (*Review*)

Code	Compound			Price:Yen
4219-v	**Amylin (Human)**	Vial	0.5 mg	41,000

-20℃

IAPP (Islet Amyloid Polypeptide)
DAP (Diabetes-Associated Peptide)
(Trifluoroacetate Form)
Lys-Cys-Asn-Thr-Ala-Thr-Cys-Ala-Thr-Gln-
Arg-Leu-Ala-Asn-Phe-Leu-Val-His-Ser-Ser-
Asn-Asn-Phe-Gly-Ala-Ile-Leu-Ser-Ser-Thr-
Asn-Val-Gly-Ser-Asn-Thr-Tyr-NH_2
(Disulfide bond between Cys^2-Cys^7)
(M.W. 3903.3) $C_{165}H_{261}N_{51}O_{55}S_2$ [122384-88-7]
Purity Information : Qx See page IV (XVI)

1) P. Westermark, C. Wernstedt, E. Wilander, D.W. Hayden, T.D. O'Brien, and K.H. Johnson, *Proc. Natl. Acad. Sci. U.S.A.*, **84**, 3881 (1987). (*Original; 36th A.A. Unknown*)
2) G.J.S. Cooper, A.C. Willis, A. Clark, R.C. Turner, R.B. Sim, and K.B.M. Reid, *Proc. Natl. Acad. Sci. U.S.A.*, **84**, 8628 (1987). (*Original; Complete Sequence*)
3) A. Clark, G.J.S. Cooper, C.E. Lewis, J.F. Morris, A.C. Willis, K.B.M. Reid, and R.C. Turner, *Lancet*, **2**, 231 (1987). (*Pharmacol; May be Pathogenic*)

Code	Compound			Price:Yen
4220-v	**Amylin (Rat)**	Vial	0.5 mg	38,000

-20℃

IAPP (Islet Amyloid Polypeptide)
DAP (Diabetes-Associated Peptide)
Lys-Cys-Asn-Thr-Ala-Thr-Cys-Ala-Thr-Gln-
Arg-Leu-Ala-Asn-Phe-Leu-Val-Arg-Ser-Ser-
Asn-Asn-Leu-Gly-Pro-Val-Leu-Pro-Pro-Thr-
Asn-Val-Gly-Ser-Asn-Thr-Tyr-NH_2
(Disulfide bond between Cys^2-Cys^7)
(M.W. 3920.4) $C_{167}H_{272}N_{52}O_{53}S_2$ [124447-81-0]

1) J.D. Leffert, C.B. Newgard, H. Okamoto, J.L. Milburn, and K.L. Luskey, *Proc. Natl. Acad. Sci. U.S.A.*, **86**, 3127 (1989). (*Original; cDNA*)
2) J. Asai, M. Nakazato, K. Kangawa, S. Matsukura, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **164**, 400 (1989). (*Original; Isolation & Structure*)

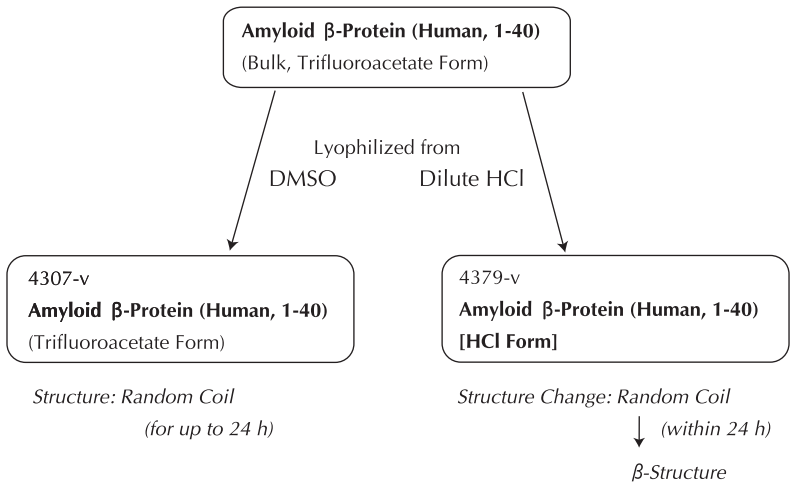
List of Products for Alzheimer's Disease Research

	Code	Compound	Quantity	Price: Yen	Page
Amyloid β-Protein Fragments					
	4307-v	**Amyloid β-Protein (Human, 1-40)**	0.5 mg vial	18,000	12
	4379-v	**Amyloid β-Protein (Human, 1-40) [HCl Form]**	0.5 mg vial	20,000	12
	4349-v	**Amyloid β-Protein (Human, 1-42)**	0.5 mg vial	30,000	13
	4370-v	**Amyloid β-Protein (Human, 1-43)**	0.5 mg vial	35,000	13
	4359-v	**Amyloid β-Protein (Human, 1-16)**	0.5 mg vial	10,000	13
	4309-v	**Amyloid β-Protein (Human, 25-35)**	0.5 mg vial	4,000	13
	4367-v	**[Pyr^3]-Amyloid β-Protein (Human, 3-42)**	0.5 mg vial	30,000	14
	4358-v	**β-Sheet Breaker Peptide iAβ5**	5 mg vial	16,000	14
Amyloid β-Protein Control Peptides					
	4413-s	**Amyloid β-Protein (40-1)**	0.1 mg vial	9,000	14
	4420-s	**Amyloid β-Protein (42-1)**	0.1 mg vial	18,000	14
β-Secretase Inhibitor					
	4378-v	**Lys-Thr-Glu-Glu-Ile-Ser-Glu-Val-Asn-Sta-Val-Ala-Glu-Phe**	1 mg vial	20,000	196
β-Secretase Substrate					
	3212-v	**MOCAc-Ser-Glu-Val-Asn-Leu-Asp-Ala-Glu-Phe-Arg-Lys(Dnp)-Arg-Arg-NH_2**	1 mg vial	15,000	221
γ-Secretase Inhibitors					
	4394-v	**L-685,458**	1 mg vial	30,000	194
	3219-v	**(3,5-Difluorophenylacetyl)-Ala-Phg-OBu^t (DAPT)**	5 mg vial	10,000	187
γ-Secretase Substrate					
	3217-v	**Nma-Gly-Gly-Val-Val-Ile-Ala-Thr-Val-Lys(Dnp)-D-Arg-D-Arg-D-Arg-NH_2**	1 mg vial	15,000	222
Antisera					
	14359-v	**Amyloid β-Protein (Human, 1-16) Antiserum**	50 µl vial	25,000	262
	14307-v	**Amyloid β-Protein (Human, 1-40) Antiserum**	50 µl vial	25,000	262
	14356-v	**Amyloid β-Protein (Human, 34-40) Antiserum**	50 µl vial	25,000	262
	14357-v	**Amyloid β-Protein (Human, 37-42) Antiserum**	50 µl vial	25,000	263
	14414-v	**Amyloid β-Protein (Human, 37-43) Antiserum**	50 µl vial	25,000	263

1) A. Rauk, *Chem. Soc. Rev.*, **38**, 2698 (2009). (*Review*)

Code	Compound			Price:Yen
4307-v -20℃	**Amyloid β-Protein (Human, 1-40)** (Trifluoroacetate Form) Asp-Ala-Glu-Phe-Arg-His-Asp-Ser-Gly-Tyr-Glu-Val-His-His-Gln-Lys-Leu-Val-Phe-Phe-Ala-Glu-Asp-Val-Gly-Ser-Asn-Lys-Gly-Ala-Ile-Ile-Gly-Leu-Met-Val-Gly-Gly-Val-Val (M.W. 4329.8) $C_{194}H_{295}N_{53}O_{58}S$ [131438-79-4] Purity Information: QZ See page IV (XVI) *Peptide Deposited in the Brain of Alzheimer's Disease Patient* 1) B.A. Yankner, L.K. Duffy, and D.A. Kirschner, *Science*, **250**, 279 (1990). (*Original*)	Vial	0.5 mg	18,000
4379-v -20℃	**Amyloid β-Protein (Human, 1-40) [HCl Form]** Lyophilized from Dilute HCl Solution Asp-Ala-Glu-Phe-Arg-His-Asp-Ser-Gly-Tyr-Glu-Val-His-His-Gln-Lys-Leu-Val-Phe-Phe-Ala-Glu-Asp-Val-Gly-Ser-Asn-Lys-Gly-Ala-Ile-Ile-Gly-Leu-Met-Val-Gly-Gly-Val-Val (M.W. 4329.8) $C_{194}H_{295}N_{53}O_{58}S$ [131438-79-4] Purity Information: QZ See page IV (XVI) *Specific Form Easily Convertible to β-Structure* 1) I. Kaneko, N. Yamada, Y. Sakuraba, M. Kamenosono, and S. Tutumi, *J. Neurochem.*, **65**, 2585 (1995). (*Original*) 2) I. Kaneko and S. Tutumi, *J. Neurochem.*, **68**, 438 (1997). (*Facile β-Structure Formation*)	Vial	0.5 mg	20,000

Bulk material of our "Amyloid β-Protein (Human, 1-40)" is synthesized in trifluoroacetate form. Vials of this peptide (Code 4307-v and Code 4379-v), described as "Trifluoroacetate Form" and "HCl Form" are then prepared by lyophilization from DMSO and dilute HCl solution, respectively. Characteristic features of these peptides, which are analyzed by CD in aqueous buffer at pH 7.4 and 37℃ (peptide concentration = 10 μM), are shown below in italics:



Code	Compound			Price:Yen
4349-v -20℃	**Amyloid β-Protein (Human, 1-42)** (Trifluoroacetate Form) Asp-Ala-Glu-Phe-Arg-His-Asp-Ser-Gly-Tyr-Glu-Val-His-His-Gln-Lys-Leu-Val-Phe-Phe-Ala-Glu-Asp-Val-Gly-Ser-Asn-Lys-Gly-Ala-Ile-Ile-Gly-Leu-Met-Val-Gly-Gly-Val-Val-Ile-Ala (M.W. 4514.0) $C_{203}H_{311}N_{55}O_{60}S$ [107761-42-2] Purity Information: Qz See page IV (XVI) *Major Plaque Component in Alzheimer's Disease* 1) D. Goldgaber, M.I. Lerman, O.W. McBride, U. Saffiotti, and D.C. Gajdusek, *Science*, **235**, 877 (1987). (*Original; cDNA*) 2) A.E. Roher, J.D. Lowenson, S. Clarke, A.S. Woods, R.J. Cotter, E. Gowing, and M.J. Ball, *Proc. Natl. Acad. Sci. U.S.A.*, **90**, 10836 (1993). (*Pathophysiology*) 3) N. Suzuki, T.T. Cheung, X.-D. Cai, A. Okada, L. Otvos, Jr., C. Eckman, T.E. Golde, and S.G. Younkin, *Science*, **264**, 1336 (1994). (*Pathophysiology*) 4) M. Citron, T.S. Diehl, G. Gordon, A.L. Biere, P. Seubert, and D.J. Selkoe, *Proc. Natl. Acad. Sci. U.S.A.*, **93**, 13170 (1996). (*Biosynthesis*)	Vial	0.5 mg	30,000
4370-v -20℃	**Amyloid β-Protein (Human, 1-43)** (Trifluoroacetate Form) Asp-Ala-Glu-Phe-Arg-His-Asp-Ser-Gly-Tyr-Glu-Val-His-His-Gln-Lys-Leu-Val-Phe-Phe-Ala-Glu-Asp-Val-Gly-Ser-Asn-Lys-Gly-Ala-Ile-Ile-Gly-Leu-Met-Val-Gly-Gly-Val-Val-Ile-Ala-Thr (M.W. 4615.1) $C_{207}H_{318}N_{56}O_{62}S$ [134500-80-4] Purity Information: Qz See page IV (XVI) 1) A. Tamaoka, T. Kondo, A. Odaka, N. Sahara, N. Sawamura, K. Ozawa, N. Suzuki, S. Shoji, and H. Mori, *Biochem. Biophys. Res. Commun.*, **205**, 834 (1994). (*Pharmacol.*) 2) K. Hsiao, P. Chapman, S. Nilsen, C. Eckman, Y. Harigaya, S. Younkin, F. Yang, and G. Cole, *Science*, **274**, 99 (1996). (*Pharmacol.*) 3) K. Duff, C. Eckman, C. Zehr, X. Yu, C.-M. Prada, J. Perez-tur, M. Hutton, L. Buee, Y. Harigaya, D. Yager, D. Morgan, M.N. Gordon, L. Holcomb, L. Refolo, B. Zenk, J. Hardy, and S. Younkin, *Nature*, **383**, 710 (1996). (*Pharmacol.*) 4) T. Kawarabayashi, Y. Igeta, M. Sato, A. Sasaki, E. Matsubara, M. Kanai, Y. Tomidokoro, K. Ishiguro, K. Okamoto, S. Hirai, and M. Shoji, *Brain Res.*, **765**, 343 (1997). (*Pharmacol.*)	Vial	0.5 mg	35,000
4359-v -20℃	**Amyloid β-Protein (Human, 1-16)** Asp-Ala-Glu-Phe-Arg-His-Asp-Ser-Gly-Tyr-Glu-Val-His-His-Gln-Lys (M.W. 1955.0) $C_{84}H_{119}N_{27}O_{28}$ [131580-10-4] *Blocker for Plaque-Induced Microgliosis / Reducer for Brain Inflammation* 1) D. Giulian, L.J. Haverkamp, J. Yu, W. Karshin, D. Tom, J. Li, A. Kazanskaia, J. Kirkpatrick, and A.E. Roher, *J. Biol. Chem.*, **273**, 29719 (1998). (*Original; Pharmacol.*) 2) M. Nakamura, N. Shishido, A. Nunomura, M.A. Smith, G. Perry, Y. Hayashi, K. Nakayama, and T. Hayashi, *Biochemistry*, **46**, 12737 (2007). (*Pharmacol.*)	Vial	0.5 mg	10,000
4309-v -20℃	**Amyloid β-Protein (Human, 25-35)** (Trifluoroacetate Form) Gly-Ser-Asn-Lys-Gly-Ala-Ile-Ile-Gly-Leu-Met (M.W. 1060.3) $C_{45}H_{81}N_{13}O_{14}S$ [131602-53-4] *Neurotrophic / Neurodegenerative Peptide* 1) B.A. Yankner, L.K. Duffy, and D.A. Kirschner, *Science*, **250**, 279 (1990). (*Original*) 2) L. Meda, M.A. Cassatella, G.I. Szendrei, L. Otvos, Jr., P. Baron, M. Villalba, D. Ferrari, and F. Rossi, *Nature*, **374**, 647 (1995). (*Pharmacol.*) 3) L. Millucci, L. Ghezzi, G. Bernardini, and A. Santucci, *Curr. Protein Pept. Sci.*, **11**, 54 (2010). (*Review*)	Vial	0.5 mg	4,000

Code	Compound			Price:Yen
4367-v -20℃	**[Pyr^3]-Amyloid β-Protein (Human, 3-42)** (Trifluoroacetate Form) Pyr-Phe-Arg-His-Asp-Ser-Gly-Tyr-Glu-Val-His-His-Gln-Lys-Leu-Val-Phe-Phe-Ala-Glu-Asp-Val-Gly-Ser-Asn-Lys-Gly-Ala-Ile-Ile-Gly-Leu-Met-Val-Gly-Gly-Val-Val-Ile-Ala (M.W. 4309.9) $C_{196}H_{299}N_{53}O_{55}S$ [183449-57-2] Purity Information: Qz See page IV (XVI) *Major Neuritic Plaque Component in Alzheimer's Disease* 1) T.C. Saido, T. Iwatsubo, D.M.A. Mann, H. Shimada, Y. Ihara, and S. Kawashima, *Neuron*, **14**, 457 (1995). (*Pharmacol.; Dominant Deposition in Senile Plaques*) 2) T. Iwatsubo, T.C. Saido, D.M.A. Mann, V.M.-Y. Lee, and J.Q. Trojanowski, *Am. J. Pathol.*, **149**, 1823 (1996). (*Histochem.; Distribution in Brains of Patients*) 3) Y.-M. Kuo, M.R. Emmerling, A.S. Woods, R.J. Cotter, and A.E. Roher, *Biochem. Biophys. Res. Commun.*, **237**, 188 (1997). (*Pharmacol.; Form in Neuritic Plaques and Vascular Amyloid Deposits*)	Vial	0.5 mg	30,000
4413-s -20℃	**Amyloid β-Protein (40-1)** **Peptide with Reversed Sequence of Amyloid β-Protein (Human, 1-40)** (Trifluoroacetate Form) Val-Val-Gly-Gly-Val-Met-Leu-Gly-Ile-Ile-Ala-Gly-Lys-Asn-Ser-Gly-Val-Asp-Glu-Ala-Phe-Phe-Val-Leu-Lys-Gln-His-His-Val-Glu-Tyr-Gly-Ser-Asp-His-Arg-Phe-Glu-Ala-Asp (M.W. 4329.8) $C_{194}H_{295}N_{53}O_{58}S$ [144409-99-4] Purity Information : Qz See page IV (XVI) *Control Peptide for Amyloid β-Protein (Human, 1-40)*	Vial	0.1 mg	9,000
4420-s -20℃	**Amyloid β-Protein (42-1)** **Peptide with Reversed Sequence of Amyloid β-Protein (Human, 1-42)** (Trifluoroacetate Form) Ala-Ile-Val-Val-Gly-Gly-Val-Met-Leu-Gly-Ile-Ile-Ala-Gly-Lys-Asn-Ser-Gly-Val-Asp-Glu-Ala-Phe-Phe-Val-Leu-Lys-Gln-His-His-Val-Glu-Tyr-Gly-Ser-Asp-His-Arg-Phe-Glu-Ala-Asp (M.W. 4514.0) $C_{203}H_{311}N_{55}O_{60}S$ [317366-82-8] Purity Information : Qz See page IV (XVI) *Control Peptide for Amyloid β-Protein (Human, 1-42)*	Vial	0.1 mg	18,000
4358-v -20℃	**β-Sheet Breaker Peptide iAβ5** Leu-Pro-Phe-Phe-Asp (M.W. 637.72) $C_{33}H_{43}N_5O_8$ [182912-74-9] *Inhibitor of Amyloid Deposition* 1) C. Soto, E.M. Sigurdsson, L. Morelli, R.A. Kumar, E.M. Castano, and B. Frangione, *Nat. Med.*, **4**, 822 (1998). (*Original; Pharmacol.*)	Vial	5 mg	16,000

1) I.H. Page and F.M. Bumpus (eds.), Angiotensin, *Handbook of Experimental Pharmacology*, **Vol. 37**, Springer-Verlag, Berlin, 1974. (*Review*)
2) M.J. Peach, *Physiol. Rev.*, **57**, 313 (1977). (*Review*)

List of Angiotensin and Related Peptides

	Code	Compound	Quantity	Price: Yen	Page
Agonist					
	4007-v	**Angiotensin I (Human)***	0.5 mg vial	2,900	below
	4069-v	**[Val^5]-Angiotensin I (Bovine)***	0.5 mg vial	3,200	16
	4001-v	**Angiotensin II (Human)***	0.5 mg vial	2,700	below
	4034-v	**[Val^5]-Angiotensin II***	0.5 mg vial	2,800	17
	4036-v	**[Asn^1,Val^5]-Angiotensin II***	0.5 mg vial	2,800	16
	4028-v	**Angiotensin III (Human)***	0.5 mg vial	2,700	below
	4296-v	**CGP 42112**	0.5 mg vial	5,000	18
	4439-v	**Proangiotensin-12 (Rat)**	0.5 mg vial	4,000	18
Antagonist					
	4035-v	**[Sar^1,Ala^8]-Angiotensin II***	0.5 mg vial	2,800	17
	4016-v	**[Sar^1,Ile^8]-Angiotensin II***	0.5 mg vial	2,700	17
	4102-v	**[Sar^1,Thr^8]-Angiotensin II***	0.5 mg vial	2,900	17
	4071-v	**[Sar^1,Val^5,Ala^8]-Angiotensin II***	0.5 mg vial	2,900	17
	4037-v	**Des-Asp^1-[Ile^8]-Angiotensin II***	0.5 mg vial	2,700	18
Ligand					
	4331-v	**Angiotensin IV (Human)***	0.5 mg vial	2,700	16
	4332-v	**Angiotensin (Human, 1-7)***	0.5 mg vial	2,700	16

* Other bulk packaging is available.

Code	Compound			Price:Yen
4007-v -20℃	**Angiotensin I (Human)***	Vial	0.5 mg	2,900
	(Porcine, Canine, Rat, Mouse, Rabbit, Guinea pig) Asp-Arg-Val-Tyr-Ile-His-Pro-Phe-His-Leu (M.W. 1296.5) $C_{62}H_{89}N_{17}O_{14}$ [484-42-4]			
4007 -20℃	**Angiotensin I (Human)***	Bulk	25 mg	39,000
	(Porcine, Canine, Rat, Mouse, Rabbit, Guinea pig)		100 mg	104,000
	Asp-Arg-Val-Tyr-Ile-His-Pro-Phe-His-Leu • 2AcOH • $4H_2O$ (M.W. 1296.5 • 120.10 • 72.06) $C_{62}H_{89}N_{17}O_{14}$ • $2CH_3COOH$ • $4H_2O$ [70937-97-2]			
	1) K. Arakawa, M. Nakatani, A. Minohara, and M. Nakamura, *Biochem. J.*, **104**, 900 (1967). (*Original; Human*) 2) T. Nakayama, T. Nakajima, and H. Sokabe, *Chem. Pharm. Bull.*, **20**, 1579 (1972). (*Original; Rat*) 3) H. Akagi, T. Hayashi, T. Nakayama, T. Nakajima, T.X. Watanabe, and H. Sokabe, *Chem. Pharm. Bull.*, **30**, 2498 (1982). (*Original; Porcine etc.*) 4) W.M. Clouston, B.A. Evans, J. Haralambidis, and R.I. Richards, *Genomics*, **2**, 240 (1988). (*Original; Mouse-cDNA*)			
4001-v -20℃	**Angiotensin II (Human)***	Vial	0.5 mg	2,700
	Asp-Arg-Val-Tyr-Ile-His-Pro-Phe (M.W. 1046.2) $C_{50}H_{71}N_{13}O_{12}$ [4474-91-3]			
4001 -20℃	**Angiotensin II (Human)***	Bulk	25 mg	38,000
	Asp-Arg-Val-Tyr-Ile-His-Pro-Phe • AcOH • $4H_2O$		100 mg	100,000
	(M.W. 1046.2 • 60.05 • 72.06) $C_{50}H_{71}N_{13}O_{12}$ • CH_3COOH • $4H_2O$			
	1) K. Arakawa, M. Nakatani, A. Minohara, and M. Nakamura, *Biochem. J.*, **104**, 900 (1967). (*Original*)			
4028-v -20℃	**Angiotensin III (Human)***	Vial	0.5 mg	2,700
	Arg-Val-Tyr-Ile-His-Pro-Phe (M.W. 931.09) $C_{46}H_{66}N_{12}O_9$ [13602-53-4]			
4028 -20℃	**Angiotensin III (Human)***	Bulk	25 mg	30,000
	Arg-Val-Tyr-Ile-His-Pro-Phe • 2AcOH • $4H_2O$		100 mg	80,000
	(M.W. 931.09 • 120.10 • 72.06) $C_{46}H_{66}N_{12}O_9$ • $2CH_3COOH$ • $4H_2O$ [100900-06-9]			
	1) W.B. Campbell, S.N. Brooks, and W.A. Pettinger, *Science*, **184**, 994 (1974). (*Original*)			

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Code	Compound			Price:Yen
4331-v -20℃	**Angiotensin IV (Human)*** **Angiotensin (Human, 3-8)** Val-Tyr-Ile-His-Pro-Phe (M.W. 774.91) $C_{40}H_{54}N_8O_8$ [23025-68-5]	Vial	0.5 mg	2,700
4331 -20℃	**Angiotensin IV (Human)*** **Angiotensin (Human, 3-8)** Val-Tyr-Ile-His-Pro-Phe • $^1/_2$AcOH • $3H_2O$ (M.W. 774.91 • 30.03 • 54.05) $C_{40}H_{54}N_8O_8$ • $^1/_2CH_3COOH$ • $3H_2O$ 1) R.L. Haberl, P.J. Decker, and K.M. Einhäupl, *Circ. Res.*, **68**, 1621 (1991). (*Biological Activity*) 2) J.W. Harding, V.I. Cook, A.V. Miller-Wing, J.M. Hanesworth, M.F. Sardinia, K.L. Hall, J.W. Stobb, G.N. Swanson, J.K.M. Coleman, J.W. Wright, and E.C. Harding, *Brain Res.*, **583**, 340 (1992). (*Specific Binding Site in Brain*) 3) J.M. Hanesworth, M.F. Sardinia, L.T. Krebs, K.L. Hall, and J.W. Harding, *J. Pharmacol. Exp. Ther.*, **266**, 1036 (1993). (*Specific Binding Site in Heart*) 4) M. de Gasparo, A. Husain, W. Alexander, K.J. Catt, A.T. Chiu, M. Drew, T. Goodfriend, J.W. Harding, T. Inagami, and P.B.M.W.M. Timmermans, *Hypertension*, **25**, 924 (1995). (*AT_4 Receptor; Non $AT_{1/2}$ Recognition, Nomenclature*)	Bulk	25 mg	30,000
4069-v -20℃	**[Val^5]-Angiotensin I (Bovine)*** Asp-Arg-Val-Tyr-Val-His-Pro-Phe-His-Leu (M.W. 1282.4) $C_{61}H_{87}N_{17}O_{14}$ [484-43-5]	Vial	0.5 mg	3,200
4069 -20℃	**[Val^5]-Angiotensin I (Bovine)*** Asp-Arg-Val-Tyr-Val-His-Pro-Phe-His-Leu • AcOH • $5H_2O$ (M.W. 1282.4 • 60.05 • 90.08) $C_{61}H_{87}N_{17}O_{14}$ • CH_3COOH • $5H_2O$ 1) D.F. Elliott and W.S. Peart, *Biochem. J.*, **65**, 246 (1957). (*Original; Heterogenous Renin*) 2) H. Akagi, T. Hayashi, T. Nakayama, T. Nakajima, T.X. Watanabe, and H. Sokabe, *Chem. Pharm. Bull.*, **30**, 2498 (1982). (*Original; Homologous Renin*) 3) M. Takai, Y. Kurano, T. Kimura, and S. Sakakibara, *Peptide Chemistry 1979*, 187 (1980). (*Chem. Synthesis*)	Bulk	25 mg	50,000
4036-v -20℃	**[Asn^1,Val^5]-Angiotensin II*** Asn-Arg-Val-Tyr-Val-His-Pro-Phe (M.W. 1031.2) $C_{49}H_{70}N_{14}O_{11}$ [53-73-6]	Vial	0.5 mg	2,800
4036 -20℃	**[Asn^1,Val^5]-Angiotensin II*** Asn-Arg-Val-Tyr-Val-His-Pro-Phe • AcOH • $4H_2O$ (M.W. 1031.2 • 60.05 • 72.06) $C_{49}H_{70}N_{14}O_{11}$ • CH_3COOH • $4H_2O$	Bulk	25 mg	41,000
4332-v -20℃	**Angiotensin (Human, 1-7)*** **(Canine, Rat)** Asp-Arg-Val-Tyr-Ile-His-Pro (M.W. 899.00) $C_{41}H_{62}N_{12}O_{11}$ [51833-78-4]	Vial	0.5 mg	2,700
4332 -20℃	**Angiotensin (Human, 1-7)*** **(Canine, Rat)** Asp-Arg-Val-Tyr-Ile-His-Pro • AcOH • $4H_2O$ (M.W. 899.00 • 60.05 • 72.06) $C_{41}H_{62}N_{12}O_{11}$ • CH_3COOH • $4H_2O$ 1) M.T. Schiavone, R.A.S. Santos, K.B. Brosnihan, M.C. Khosla, and C.M. Ferrario, *Proc. Natl. Acad. Sci. U.S.A.*, **85**, 4095 (1988). (*Original*) 2) C.M. Ferrario, K.B. Brosnihan, D.I. Diz, N. Jaiswal, M.C. Khosla, A. Milsted, and E.A. Tallant, *Hypertension*, **18** (**Suppl. III**), III-126 (1991). (*Review*) 3) R.A.S. Santos, K.B. Brosnihan, D.W. Jacobsen, P.E. DiCorleto, and C.M. Ferrario, *Hypertension*, **19** (**Suppl. II**), II-56 (1992). (*Metabolic Pathway*) 4) A. DelliPizzi, S.D. Hilchey, and C.P. Bell-Quilley, *Br. J. Pharmacol.*, **111**, 1 (1994). (*Pharmacol.*)	Bulk	25 mg	30,000

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Code	Compound			Price:Yen
4035-v -20℃	**[Sar^1,Ala^8]-Angiotensin II** Sar-Arg-Val-Tyr-Ile-His-Pro-Ala (M.W. 926.07) $C_{43}H_{67}N_{13}O_{10}$ [38027-95-1]	Vial	0.5 mg	2,800
4035 -20℃	**[Sar^1,Ala^8]-Angiotensin II** Sar-Arg-Val-Tyr-Ile-His-Pro-Ala • AcOH • 4H_2O (M.W. 926.07 • 60.05 • 72.06) $C_{43}H_{67}N_{13}O_{10}$ • CH_3COOH • 4H_2O *Angiotensin II Selective Antagonist* 1) D.T. Pals, F.D. Masucci, G.S. Denning, Jr., F. Sipos, and D.C. Fessler, *Circ. Res.*, **29**, 673 (1971). (*Original*) 2) F.M. Bumpus, S. Sen, R.R. Smeby, C. Sweet, C.M. Ferrario, and M.C. Khosla, *Circ. Res.*, **32** and **33** (Suppl.I), I-150 (1973). (*Pharmacol.*)	Bulk	25 mg 100 mg	34,000 96,000
4016-v -20℃	**[Sar^1,Ile^8]-Angiotensin II** Sar-Arg-Val-Tyr-Ile-His-Pro-Ile (M.W. 968.15) $C_{46}H_{73}N_{13}O_{10}$ [37827-06-8]	Vial	0.5 mg	2,700
4016 -20℃	**[Sar^1,Ile^8]-Angiotensin II** Sar-Arg-Val-Tyr-Ile-His-Pro-Ile • AcOH • 4H_2O (M.W. 968.15 • 60.05 • 72.06) $C_{46}H_{73}N_{13}O_{10}$ • CH_3COOH • 4H_2O *Angiotensin II Selective Antagonist* 1) R.K. Türker, M.M. Hall, M. Yamamoto, C.S. Sweet,and F.M. Bumpus, *Science*, **177**, 1203 (1972). (*Original*) 2) F.M. Bumpus, S. Sen, R.R. Smeby, C. Sweet, C.M. Ferrario, and M.C. Khosla, *Circ. Res.*, **32** and **33** (Suppl.I), I-150 (1973). (*Pharmacol.*)	Bulk	25 mg 100 mg	34,000 96,000
4102-v -20℃	**[Sar^1,Thr^8]-Angiotensin II** Sar-Arg-Val-Tyr-Ile-His-Pro-Thr (M.W. 956.10) $C_{44}H_{69}N_{13}O_{11}$ [53632-49-8]	Vial	0.5 mg	2,900
4102 -20℃	**[Sar^1,Thr^8]-Angiotensin II** Sar-Arg-Val-Tyr-Ile-His-Pro-Thr • 2AcOH • 4H_2O (M.W. 956.10 • 120.10 • 72.06) $C_{44}H_{69}N_{13}O_{11}$ • 2CH_3COOH • 4H_2O *Angiotensin II Selective Antagonist* 1) M.C. Khosla, M.M. Hall, R.B. Smeby, and F.M. Bumpus, *J. Med. Chem.*, **17**, 1156 (1974). (*Original*)	Bulk	25 mg	41,000
4071-v -20℃	**[Sar^1,Val^5,Ala^8]-Angiotensin II*** Sar-Arg-Val-Tyr-Val-His-Pro-Ala (M.W. 912.05) $C_{42}H_{65}N_{13}O_{10}$ [34273-10-4]	Vial	0.5 mg	2,900
4071 -20℃	**[Sar^1,Val^5,Ala^8]-Angiotensin II*** Sar-Arg-Val-Tyr-Val-His-Pro-Ala • AcOH • 4H_2O (M.W. 912.05 • 60.05 • 72.06) $C_{42}H_{65}N_{13}O_{10}$ • CH_3COOH • 4H_2O *Angiotensin II Selective Antagonist* 1) D.T. Pals, F.D. Masucci, G.S. Denning, Jr., F. Sipos, and D.C. Fessler, *Circ. Res.*, **29**, 673 (1971). (*Original*)	Bulk	25 mg	41,000
4034-v -20℃	**[Val^5]-Angiotensin II*** Asp-Arg-Val-Tyr-Val-His-Pro-Phe (M.W. 1032.2) $C_{49}H_{69}N_{13}O_{12}$ [58-49-1]	Vial	0.5 mg	2,800
4034 -20℃	**[Val^5]-Angiotensin II*** Asp-Arg-Val-Tyr-Val-His-Pro-Phe • AcOH • 4H_2O (M.W. 1032.2 • 60.05 • 72.06) $C_{49}H_{69}N_{13}O_{12}$ • CH_3COOH • 4H_2O [5649-07-0] 1) D.F. Elliott and W.S. Peart, *Nature*, **177**, 527 (1956). (*Original; Heterogenous Renin*) 2) H. Akagi, T. Hayashi, T. Nakayama, T. Nakajima, T.X. Watanabe, and H. Sokabe, *Chem. Pharm. Bull.*, **30**, 2498 (1982). (*Original; Homologous Renin*)	Bulk	25 mg 100 mg	34,000 96,000

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Angiotensin and Related Peptides (continued)

Code	Compound			Price:Yen
4037-v -20℃	**Des-Asp^1-[Ile^8]-Angiotensin II** Arg-Val-Tyr-Ile-His-Pro-Ile (M.W. 897.08) $C_{43}H_{68}N_{12}O_9$ [52498-25-6]	Vial	0.5 mg	2,700
4037 -20℃	**Des-Asp^1-[Ile^8]-Angiotensin II** Arg-Val-Tyr-Ile-His-Pro-Ile • 2AcOH • 4H_2O (M.W. 897.08 • 120.10 • 72.06) $C_{43}H_{68}N_{12}O_9$ • 2CH_3COOH • 4H_2O [102029-49-2] *Angiotensin III Selective Antagonist* 1) T. Kono, F. Ikeda, F. Oseko, H. Imura, and J. Endo, *J. Clin. Endocrinol. Metab.*, **52**, 354 (1981). (*Pharmacol.*)	Bulk	25 mg 100 mg	33,000 88,000
4296-v -20℃	**CGP 42112** Nic-Tyr-Lys(Z-Arg)-His-Pro-Ile (Nic-: Nicotinoyl, Z-: Benzyloxycarbonyl) (M.W. 1052.2) $C_{52}H_{69}N_{13}O_{11}$ [127060-75-7] *Angiotensin AT_2 Receptor Agonist* 1) S.E. Whitebread, V. Taylor, S.P. Bottari, B. Kamber, and M. de Gasparo, *Biochem. Biophys. Res. Commun.*, **181**, 1365 (1991). (*Original*) 2) B. Buisson, S.P. Bottari, M. de Gasparo, N. Gallo-Payet, and M.D. Payet, *FEBS Lett.*, **309**, 161 (1992). (*Pharmacol.*) 3) G. Koike, M. Horiuchi, T. Yamada, C. Szpirer, H.J. Jacob, and V.J. Dzau, *Biochem. Biophys. Res. Commun.*, **203**, 1842 (1994). (*Pharmacol.*)	Vial	0.5 mg	5,000
4439-v -20℃	**Proangiotensin-12 (Rat)** Asp-Arg-Val-Tyr-Ile-His-Pro-Phe-His-Leu-Leu-Tyr (M.W. 1572.8) $C_{77}H_{109}N_{19}O_{17}$ [914910-73-9] *New Member of Angiotensin Family*	Vial	0.5 mg	4,000

It is well-established that the renin-angiotensin system plays an essential role in the maintenance of blood pressure and body fluid homeostasis [M.J. Peach, *Physiol. Rev.*, **57**, 313 (1977). (*Review*), D.J. Campbell, *J. Clin. Invest.*, **79**, 1 (1987). (*Review*)]. In the cardiovascular system, the expressed angiotensinogen is cleaved by renin, which generates a 10 amino acid residue peptide, angiotensin I (Ang I). This Ang I is attacked by angiotensin I converting enzyme (ACE), and the carboxyl-terminal 2 amino acid truncated Ang II is produced. Further trimmed peptides of Ang II at either the amino- or carboxyl-terminus, that is, Ang III, Ang IV, and Ang (1-7), were also identified in mammals. As far as we know, the primary structure of Ang I is conserved in many animals (human, rat, porcine, canine, rabbit, and guinea pig), although bovine Ang I is Val^5 instead of Ile^5.

Code	Compound	Primary structure
4007-v	Angiotensin I (Human)	DRVYIHPFHL
4001-v	Angiotensin II (Human)	DRVYIHPF
4028-v	Angiotensin III (Human)	RVYIHPF
4331-v	Angiotensin IV (Human)	VYIHPF
4332-v	Angiotensin (Human, 1-7)	DRVYIHP
4439-v	Proangiotensin-12 (Rat)	DRVYIHPFHLLY

Angiotensin and Related Peptides (continued)

In the survey of Ang-related peptide in the various tissues, a novel form of the peptide was isolated as a major component in the small intestine of rats[1]. The isolated peptide, named **proangiotensin-12**, elutes later than Ang II and Ang I on reversed-phase (RP)-HPLC, and its primary structure, analyzed by tandem mass spectrometric method, revealed that **proangiotensin-12** is composed of 12 amino acid residues corresponding to the amino-terminus of angiotensinogen. Thus, **proangiotensin-12** is the carboxyl-terminally 2 amino acid-extended form of Ang I. Immunological **proangiotensin-12** is detected in a variety of tissues as a major component except for lungs, adrenal glands, pancreas, and aorta. In contrast, the plasma concentration of **proangiotensin-12** is lower than those of Ang I and Ang II. Biological activity measurements indicate that **i)** **proangiotensin-12** constricts rat aortic ring preparation in a dose-dependent manner (3-100 nM), **ii)** the constricting activity is blocked completely by either ACE inhibitor or Ang II type 1 blocker, and **iii)** **proangiotensin-12** elicits the blood pressure rise in rats (3-100 pmol/kg). These results suggest that the observed functions of **proangiotensin-12** may be afforded by converting the parental **proangiotensin-12** to Ang II through Ang I.

Proangiotensin-12 is now available as a new member of the endogenous angiotensin peptide family. This alternatively processed peptide of angiotensinogen may shed some light on evaluating the functions elicited by the angiotensin family peptides, which may be sustained by the lack of the endogenous peptide of **proangiotensin-12**. The enzyme(s) involved and the mechanism by which **proangiotensin-12** is produced remains to be clarified.

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

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ANP and Related Peptides

1) P. Needleman, E.H. Blaine, J.E. Greenwald, M.L. Michener, C.B. Saper, P.T. Stockmann, and H.E. Tolunay, *Annu. Rev. Pharmacol. Toxicol.*, **29**, 23 (1989). (*Review*)
2) A. Rosenzweig and C.E. Seidman, *Annu. Rev. Biochem.*, **60**, 229 (1991). (*Review*)

List of ANP and Related Peptides

Species	Code	Compound	Quantity	Price: Yen	Page
Human					
	4135-s	**ANP (Human, 1-28)**	0.1 mg vial	11,000	20
	4135-v	**ANP (Human, 1-28)**	0.5 mg vial	34,000	20
	4145-v	**[Met(O)^{12}]-ANP (Human, 1-28)**	0.5 mg vial	37,000	20
	4138-v	**ANP (Human, 5-27)**	0.5 mg vial	29,000	20
	4137-v	**ANP (Human, 5-28)**	0.5 mg vial	29,000	20
	4139-v	**ANP (Human, 7-28)**	0.5 mg vial	29,000	21
	4168-s	**β-ANP (Human), Antiparallel Dimer**	0.1 mg vial	30,000	21
Rat					
	4151-s	**ANP (Rat, 1-28)**	0.1 mg vial	11,000	21
	4151-v	**ANP (Rat, 1-28)**	0.5 mg vial	34,000	21
	4159-v	**ANP (Rat, 3-28)**	0.5 mg vial	29,000	21

ANP and Related Peptides (continued)

Code	Compound			Price:Yen
4135-s -20℃	**ANP (Human, 1-28)*** **A-type (Atrial) Natriuretic Peptide (Human,1-28)** **(Porcine, Bovine, Canine)** Ser-Leu-Arg-Arg-Ser-Ser-Cys-Phe-Gly-Gly- Arg-Met-Asp-Arg-Ile-Gly-Ala-Gln-Ser-Gly- Leu-Gly-Cys-Asn-Ser-Phe-Arg-Tyr (Disulfide bond between Cys^{7}-Cys^{23}) (M.W. 3080.4) $C_{127}H_{203}N_{45}O_{39}S_3$ [91917-63-4]	Vial	0.1 mg	11,000
4135-v -20℃	**ANP (Human, 1-28)*** **A-type (Atrial) Natriuretic Peptide (Human,1-28)** **(Porcine, Bovine, Canine)** 1) K. Kangawa and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **118**, 131 (1984). *(Original)* 2) T.X. Watanabe, Y. Noda, N. Chino, Y. Nishiuchi, T. Kimura, S. Sakakibara, and M. Imai, *Eur. J. Pharmacol.*, **147**, 49 (1988). *(Pharmacol.)*	Vial	0.5 mg	34,000
4145-v -20℃	**[Met(O)^{12}]-ANP (Human, 1-28)*** **[Met(O)^{12}]-A-type (Atrial) Natriuretic Peptide (Human, 1-28)** Ser-Leu-Arg-Arg-Ser-Ser-Cys-Phe-Gly-Gly- Arg-Met(O)-Asp-Arg-Ile-Gly-Ala-Gln-Ser-Gly- Leu-Gly-Cys-Asn-Ser-Phe-Arg-Tyr (Disulfide bond between Cys^{7}-Cys^{23}) (M.W. 3096.4) $C_{127}H_{203}N_{45}O_{40}S_3$ 1) T.X. Watanabe, Y. Noda, N. Chino, Y. Nishiuchi, T. Kimura, S. Sakakibara, and M. Imai, *Eur. J. Pharmacol.*, **147**, 49 (1988). *(Pharmacol.)*	Vial	0.5 mg	37,000
4138-v -20℃	**ANP (Human, 5-27)*** **A-type (Atrial) Natriuretic Peptide (Human, 5-27)** Ser-Ser-Cys-Phe-Gly-Gly-Arg-Met-Asp-Arg- Ile-Gly-Ala-Gln-Ser-Gly-Leu-Gly-Cys-Asn- Ser-Phe-Arg (Disulfide bond between Cys^{7}-Cys^{23}) (M.W. 2404.7) $C_{97}H_{154}N_{34}O_{32}S_3$ 1) T.X. Watanabe, Y. Noda, N. Chino, Y. Nishiuchi, T. Kimura, S. Sakakibara, and M. Imai, *Eur. J. Pharmacol.*, **147**, 49 (1988). (*Pharmacol.*)	Vial	0.5 mg	29,000
4137-v -20℃	**ANP (Human, 5-28)*** **A-type (Atrial) Natriuretic Peptide (Human, 5-28**) Ser-Ser-Cys-Phe-Gly-Gly-Arg-Met-Asp-Arg- Ile-Gly-Ala-Gln-Ser-Gly-Leu-Gly-Cys-Asn- Ser-Phe-Arg-Tyr (Disulfide bond between Cys^{7}-Cys^{23}) (M.W. 2567.8) $C_{106}H_{163}N_{35}O_{34}S_3$ 1) S. Ueda, T. Sudoh, K. Fukuda, K. Kangawa, N. Minamino, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **149**, 1055 (1987). *(Original)* 2) T.X. Watanabe, Y. Noda, N. Chino, Y. Nishiuchi, T. Kimura, S. Sakakibara, and M. Imai, *Eur. J. Pharmacol.*, **147**, 49 (1988). *(Pharmacol.)*	Vial	0.5 mg	29,000

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Code	Compound			Price:Yen
4139-v -20℃	**ANP (Human, 7-28)*** **A-type (Atrial) Natriuretic Peptide (Human, 7-28)** Cys-Phe-Gly-Gly-Arg-Met-Asp-Arg-Ile-Gly-Ala-Gln-Ser-Gly-Leu-Gly-Cys-Asn-Ser-Phe-Arg-Tyr (Disulfide bond between Cys^{7}-Cys^{23}) (M.W. 2393.7) $C_{100}H_{153}N_{33}O_{30}S_3$ 1) T.X. Watanabe, Y. Noda, N. Chino, Y. Nishiuchi, T. Kimura, S. Sakakibara, and M. Imai, *Eur. J. Pharmacol.*, **147**, 49 (1988). *(Pharmacol.)*	Vial	0.5 mg	29,000
4168-s -20℃	**β-ANP (Human)*** **β-A-type (Atrial) Natriuretic Peptide** **Antiparallel Dimer of ANP (Human, 1-28)** **Ser-Leu-Arg-Arg-Ser-Ser-Cys^{7}-Phe-Gly-Gly-Arg-Met-Asp-Arg-Ile-Gly-Ala-Gln-Ser-Gly-Leu-Gly-Cys^{23}-Asn-Ser-Phe-Arg-Tyr** **Tyr-Arg-Phe-Ser-Asn-$Cys^{23'}$-Gly-Leu-Gly-Ser-Gln-Ala-Gly-Ile-Arg-Asp-Met-Arg-Gly-Gly-Phe-$Cys^{7'}$-Ser-Ser-Arg-Arg-Leu-Ser** (Disulfide bonds between Cys^{7}-$Cys^{23'}$ and $Cys^{7'}$-Cys^{23}) (M.W. 6160.9) $C_{254}H_{406}N_{90}O_{78}S_6$ 1) K. Kangawa, A. Fukuda, and H. Matsuo, *Nature*, **313**, 397 (1985). *(Original)* 2) N. Chino, K. Yoshizawa-Kumagaye, Y. Noda, T.X. Watanabe, T. Kimura, and S. Sakakibara, *Biochem. Biophys. Res. Commun.*, **141**, 665 (1986). (*Chem. Synthesis & Pharmacol.*)	Vial	0.1 mg	30,000
4151-s -20℃	**ANP (Rat, 1-28)** **A-type (Atrial) Natriuretic Peptide (Rat, 1-28)** **(Rabbit, Mouse)** Ser-Leu-Arg-Arg-Ser-Ser-Cys-Phe-Gly-Gly-Arg-Ile-Asp-Arg-Ile-Gly-Ala-Gln-Ser-Gly-Leu-Gly-Cys-Asn-Ser-Phe-Arg-Tyr (Disulfide bond between Cys^{7}-Cys^{23}) (M.W. 3062.4) $C_{128}H_{205}N_{45}O_{39}S_2$ [88898-17-3]	Vial	0.1 mg	11,000
4151-v -20℃	**ANP (Rat, 1-28)*** **A-type (Atrial) Natriuretic Peptide (Rat, 1-28)** **(Rabbit, Mouse)** 1) T.G. Flynn, M.L. DeBold, and A.J. DeBold, *Biochem. Biophys. Res. Commun.*, **117**, 859 (1983). (*Original*) 2) T.X. Watanabe, Y. Noda, N. Chino, Y. Nishiuchi, T. Kimura, S. Sakakibara, and M. Imai, *Eur. J. Pharmacol.*, **147**, 49 (1988). *(Pharmacol.)*	Vial	0.5 mg	34,000
4159-v -20℃	**ANP (Rat, 3-28)** **A-type (Atrial) Natriuretic Peptide (Rat, 3-28)** Arg-Arg-Ser-Ser-Cys-Phe-Gly-Gly-Arg-Ile-Asp-Arg-Ile-Gly-Ala-Gln-Ser-Gly-Leu-Gly-Cys-Asn-Ser-Phe-Arg-Tyr (Disulfide bond between Cys^{7}-Cys^{23}) (M.W. 2862.2) $C_{119}H_{189}N_{43}O_{36}S_2$ [90984-99-9] 1) N.G. Seidah, C. Lazure, M. Chrètien, G. Thibault, R. Garcia, M. Cantin, J. Genest, R.F. Nutt, S.F. Brady, T.A. Lyle, W.J. Paleveda, C.D. Colton, T.M. Ciccarone, and D.F. Veber, *Proc. Natl. Acad. Sci. U.S.A.*, **81**, 2640 (1984). (*Original*)	Vial	0.5 mg	29,000

Arg-Arg-Leu-Ile-Glu-Asp-Ala-Glu-Tyr-Ala-Ala-Arg-Gly [RR-SRC] See Code 4184 on page 208

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Apamin

Code	Compound			Price:Yen
4257-v -20℃	**Apamin** **(Honeybee, *Apis mellifera*)** Cys-Asn-Cys-Lys-Ala-Pro-Glu-Thr-Ala-Leu-Cys-Ala-Arg-Arg-Cys-Gln-Gln-His-NH_2 (Disulfide bonds between Cys^1-Cys^{11} and Cys^3-Cys^{15}) (M.W. 2027.3) $C_{79}H_{131}N_{31}O_{24}S_4$ [24345-16-2] *Small Conductance Ca^{2+}-Activated K^+ Channel Blocker*	Vial	0.5 mg	18,000

1) E. Haberman, *Pharmacol. Ther.*, **25**, 255 (1984). (*Review*)
2) A.L. Blatz and K.L. Magleby, *Nature*, **323**, 718 (1986). (*Pharmacol.*)
3) M.L. Garcia, A. Galvez, M. Garcia-Calvo, V.F. King, J. Vazquez, and G.J. Kaczorowski, *J. Bioenerg. Biomembr.*, **23**, 615 (1991). (*Review*)

Apelins

1) S.C. Sorli, L. van den Berghe, B. Masri, B. Knibiehler, and Y. Audigier, *Drug Discov. Today*, **11**, 1100 (2006). (*Review*)
2) C. Carpene, C. Dray, C. Attane, P. Valet, M.P. Portillo, I. Churruca, F.I. Milagro, and I. Castan-Laure, *J. Physiol. Biochem.*, **63**, 359 (2007). (*Review*)
3) I. Falcao-Pires, R. Ladeiras-Lopes, and A.F. Leite-Moreira, *Expert Opin. Ther. Targets*, **14**, 633 (2010). (*Review*)

Code	Compound			Price:Yen
4362-s -20℃	**Apelin-36 (Human)** Leu-Val-Gln-Pro-Arg-Gly-Ser-Arg-Asn-Gly-Pro-Gly-Pro-Trp-Gln-Gly-Gly-Arg-Arg-Lys-Phe-Arg-Arg-Gln-Arg-Pro-Arg-Leu-Ser-His-Lys-Gly-Pro-Met-Pro-Phe (M.W. 4195.8) $C_{184}H_{297}N_{69}O_{43}S$ [252642-12-9] *Ligand for APJ Receptor*	Vial	0.1 mg	15,000

1) K. Tatemoto, M. Hosoya, Y. Habata, R. Fujii, T. Kakegawa, M.-X. Zou, Y. Kawamata, S. Fukusumi, S. Hinuma, C. Kitada, T. Kurokawa, H. Onda, and M. Fujino, *Biochem. Biophys. Res. Commun.*, **251**, 471 (1998). (*Original; Human and Bovine*)
2) M.-X. Zou, H.-Y. Liu, Y. Haraguchi, Y. Soda, K. Tatemoto, and H. Hoshino, *FEBS Lett.*, **473**, 15 (2000). (*Pharmacol.*)
3) M. Hosoya, Y. Kawamata, S. Fukusumi, R. Fujii, Y. Habata, S. Hinuma, C. Kitada, S. Honda, T. Kurokawa, H. Onda, O. Nishimura, and M. Fujino, *J. Biol. Chem.*, **275**, 21061 (2000). (*Pharmacol.*)

- This compound is distributed through Peptide Institute, Inc. under the license of Takeda Pharmaceutical Company Limited.

Code	Compound			Price:Yen
4361-v -20℃	**[Pyr^1]-Apelin-13 (Human)** (**Bovine, Rat**) Pyr-Arg-Pro-Arg-Leu-Ser-His-Lys-Gly-Pro-Met-Pro-Phe (M.W. 1533.8) $C_{69}H_{108}N_{22}O_{16}S$ [217082-60-5] *Ligand for APJ Receptor*	Vial	0.5 mg	7,000

1) K. Tatemoto, M. Hosoya, Y. Habata, R. Fujii, T. Kakegawa, M.-X. Zou, Y. Kawamata, S. Fukusumi, S. Hinuma, C. Kitada, T. Kurokawa, H. Onda, and M. Fujino, *Biochem. Biophys. Res. Commun.*, **251**, 471 (1998). (*Original; Human and Bovine*)
2) M.-X. Zou, H.-Y. Liu, Y. Haraguchi, Y. Soda, K. Tatemoto, and H. Hoshino, *FEBS Lett.*, **473**, 15 (2000). (*Pharmacol.*)
3) M. Hosoya, Y. Kawamata, S. Fukusumi, R. Fujii, Y. Habata, S. Hinuma, C. Kitada, S. Honda, T. Kurokawa, H. Onda, O. Nishimura, and M. Fujino, *J. Biol. Chem.*, **275**, 21061 (2000). (*Pharmacol.*)
4) D.K. Lee, R. Cheng, T. Nguyen, T. Fan, A.P. Kariyawasam, Y. Liu, D.H. Osmond, S.R. George, and B.F.O'Dowd, *J. Neurochem.*, **74**, 34 (2000). (*cDNA Seq.; Rat*)
5) N. De Mota, A.R.-L. Goazigo, S.E. Messari, N. Chartrel, D. Roesch, C. Dujardin, C. Kordon, H. Vaudry, F. Moos, and C. Llorens-Cortes, *Proc. Natl. Acad. Sci. U.S.A.*, **101**, 10464 (2004). (*Endogenous Apelin 13 in Rat*)

- This compound is distributed through Peptide Institute, Inc. under the license of Takeda Pharmaceutical Company Limited.

Arg-Gly-Asp-Peptides

Code	Compound			Price:Yen
4304-v -20℃	***cyclo* (Arg-Gly-Asp-D-Phe-Val)** (M.W. 574.63) $C_{26}H_{38}N_8O_7$ [137813-35-5]	Vial	0.5 mg	6,000
4304 -20℃	***cyclo* (Arg-Gly-Asp-D-Phe-Val)** • AcOH • $2H_2O$ (M.W. 574.63 • 60.05 • 36.03) $C_{26}H_{38}N_8O_7$ • CH_3COOH • $2H_2O$ *Angiogenesis Inhibitor* 1) P.C. Brooks, A.M.P. Montgomery, M. Rosenfeld, R.A. Reisfeld, T. Hu, G. Klier, and D.A. Cheresh, *Cell*, **79**, 1157 (1994). (*Original*) 2) M. Friedlander, C.L. Theesfeld, M. Sugita, M. Fruttiger, M.A. Thomas, S. Chang, and D.A. Cheresh, *Proc. Natl. Acad. Sci. U.S.A.*, **93**, 9764 (1996). (*Pharmacol.*)	Bulk	25 mg	56,000
4269-s -20℃	**Decorsin** **(Leech, *Macrobdella decora*)** Ala-Pro-Arg-Leu-Pro-Gln-Cys-Gln-Gly-Asp- Asp-Gln-Glu-Lys-Cys-Leu-Cys-Asn-Lys-Asp- Glu-Cys-Pro-Pro-Gly-Gln-Cys-Arg-Phe-Pro- Arg-Gly-Asp-Ala-Asp-Pro-Tyr-Cys-Glu (Disulfide bonds between Cys^7-Cys^{15}, Cys^{17}-Cys^{27}, and Cys^{22}-Cys^{38}) (M.W. 4377.8) $C_{179}H_{271}N_{55}O_{62}S_6$ *Glycoprotein IIb / IIIa Antagonist, Platelet Aggregation Inhibitor* 1) J.L. Seymour, W.J. Henzel, B. Nevins, J.T. Stults, and R.A. Lazarus, *J. Biol. Chem.*, **265**, 10143 (1990). (*Original*) 2) A.M. Krezel, G. Wagner, J. Seymour-Ulmer, and R.A. Lazarus, *Science*, **264**, 1944 (1994). (*S-S Bond*)	Vial	0.1 mg	25,000
4171-v -20℃	**Fibronectin Active Fragment (RGDS)** Arg-Gly-Asp-Ser (M.W. 433.42) $C_{15}H_{27}N_7O_8$ [91037-65-9]	Vial	0.5 mg	2,900
4171 -20℃	**Fibronectin Active Fragment (RGDS)** Arg-Gly-Asp-Ser • $^1/_2$AcOH • $2H_2O$ (M.W. 433.42 • 30.03 • 36.03) $C_{15}H_{27}N_7O_8$ • $^1/_2CH_3COOH$ • $2H_2O$ Purity Information: Qp See page IV (XVI) 1) M.D. Piershbacher and E. Ruoslahti, *Nature*, **309**, 30 (1984). (*Original*) 2) D.M. Haverstick, J.F. Cowan, K.M. Yamada, and S.A. Santoro, *Blood*, **66**, 946 (1985). (*Pharmacol.*)	Bulk	25 mg 100 mg	24,000 75,000
4189-v -20℃	**Fibronectin Active Fragment (GRGDS)** Gly-Arg-Gly-Asp-Ser (M.W. 490.47) $C_{17}H_{30}N_8O_9$ [96426-21-0]	Vial	0.5 mg	3,000
4189 -20℃	**Fibronectin Active Fragment (GRGDS)** Gly-Arg-Gly-Asp-Ser • $^1/_2$AcOH • $2H_2O$ (M.W. 490.47 • 30.03 • 36.03) $C_{17}H_{30}N_8O_9$ • $^1/_2CH_3COOH$ • $2H_2O$ 1) S.K. Akiyama and K.M. Yamada, *J. Biol. Chem.*, **260**, 10402 (1985). (*Original*) 2) K. Olden, S. Mohla, S.A. Newton, S.L. White, and M.J. Humphries, *Ann. N. Y. Acad. Sci.*, **551**, 421 (1988). (*Review*)	Bulk	25 mg 100 mg	28,000 75,000

Asp-Arg-Val-Tyr-Ile-His-Pro-Phe-His-Leu-Val-Ile-His See Code 4133 on page 209

Bovine Adrenal Medulla Dodecapeptide (BAM-12P)

Code	Compound			Price:Yen
4119-v -20℃	**BAM-12P** **Bovine Adrenal Medulla Dodecapeptide** Tyr-Gly-Gly-Phe-Met-Arg-Arg-Val-Gly-Arg-Pro-Glu (M.W. 1424.6) $C_{62}H_{97}N_{21}O_{16}S$ [75513-71-2] 1) K. Mizuno, N. Minamino, K. Kangawa, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **95**, 1482 (1980). (*Original*)	Vial	0.5 mg	6,600

Big Endothelin-1 (Human, 1-38) See Code 4208 on page 61

Big Endothelin-1 (Porcine, 1-39) See Code 4207 on page 61

Big Endothelin-1 (Rat, 1-39) See Code 4266 on page 61

Big Endothelin-2 (Human, 1-37) See Code 4222 on page 61

Big Endothelin-2 (Human, 1-38) See Code 4253 on page 62

Big Endothelin-3 (Human, 1-41 Amide) See Code 4223 on page 62

Big Endothelin-3 (Rat, 1-41 Amide) See Code 4267 on page 62

Big Gastrin (Human) See Code 4183 on page 68

BNP See page 30 and 31

Bombesin

Code	Compound			Price:Yen
4086-v -20℃	**Bombesin*** **(Frog, *Bombina bombina*)** Pyr-Gln-Arg-Leu-Gly-Asn-Gln-Trp-Ala-Val-Gly-His-Leu-Met-NH_2 (M.W. 1619.8) $C_{71}H_{110}N_{24}O_{18}S$ [31362-50-2]	Vial	0.5 mg	5,200
4086 -20℃	**Bombesin*** **(Frog, *Bombina bombina*)** Pyr-Gln-Arg-Leu-Gly-Asn-Gln-Trp-Ala-Val-Gly-His-Leu-Met-NH_2 • AcOH • $7H_2O$ (M.W. 1619.8 • 60.05 • 126.11) $C_{71}H_{110}N_{24}O_{18}S$ • CH_3COOH • $7H_2O$ 1) A. Anastasi, V. Erspamer, and M. Bucci, *Experientia*, **27**, 166 (1971). (*Original*) 2) V. Erspamer and P. Melchiorri, *Trends Pharmacol. Sci.*, **1**, 391 (1980). (*Review*) 3) J.G. McCoy and D.D. Avery, *Peptides*, **11**, 595 (1990). (*Review*) 4) L.K. Malendowicz, *Horm. Metab. Res.*, **30**, 374 (1998). (*Review*)	Bulk	25 mg	100,000

Bovine Adrenal Medulla Dodecapeptide See Code 4119 **BAM-12P** above

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

1) E.G. Erdös (ed.), Bradykinin, Kallidin and Kallikrein, *Handbook of Experimental Pharmacology*, **Vol. 25**, Springer-Verlag, Berlin, 1970. (*Review*)
2) E.G. Erdös (ed.), Bradykinin, Kallidin and Kallikrein, *Handbook of Experimental Pharmacology*, **Vol. 25, Suppl**. Springer-Verlag, Berlin, 1979. (*Review*)

List of Bradykinin and Related Peptides

	Code	Compound	Quantity	Price: Yen	Page
Agonist					
	4002-v	**Bradykinin***	0.5 mg vial	2,600	below
	4008-v	**Lysyl-Bradykinin (Kallidin)***	0.5 mg vial	3,100	28
	4012-v	**Methionyl-Lysyl-Bradykinin***	0.5 mg vial	3,300	29
	4130-v	**Isoleucyl-Seryl-Bradykinin***	0.5 mg vial	3,300	28
	4193-v	**[Hyp^3]-Bradykinin**	0.5 mg vial	3,200	28
	4191-v	**Lysyl-[Hyp^3]-Bradykinin**	0.5 mg vial	3,400	29
B_1-Selective Agonist					
	4303-v	**Des-Arg^{10}-Kallidin***	0.5 mg vial	2,700	27
	4067-v	**Des-Arg^9-Bradykinin***	0.5 mg vial	2,700	27
B_1-Selective Antagonist					
	4065-v	**Des-Arg^9-[Leu^8]-Bradykinin***	0.5 mg vial	2,700	27
B_2-Selective Antagonist					
	4175-v	**[Thi^{5,8},D-Phe^7]-Bradykinin**	0.5 mg vial	4,100	29
	4202-v	**D-Arginyl-[Hyp^3,Thi^{5,8},D-Phe^7]-Bradykinin***	0.5 mg vial	4,800	26
	4293-v	**D-Arginyl-[Hyp^3,Thi^5,D-Tic^7,Oic^8]-Bradykinin***	0.5 mg vial	12,000	26
Radioimmunoassay					
	4075-v	**[Tyr^8]-Bradykinin**	0.5 mg vial	3,500	29 & 241
	4056-v	**Tyrosyl-Bradykinin**	0.5 mg vial	3,200	29 & 241

* Other bulk packaging is available.

Code	Compound			Price:Yen
4002-v	**Bradykinin***	Vial	0.5 mg	2,600
-20℃	**(Human, Bovine, Rat, Mouse)**			
	Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe-Arg			
	(M.W. 1060.2) $C_{50}H_{73}N_{15}O_{11}$ [58-82-2]			
4002	**Bradykinin***	Bulk	25 mg	24,000
-20℃	**(Human, Bovine, Rat, Mouse)**		100 mg	64,000
	Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe-Arg • 2AcOH • $3H_2O$			
	(M.W. 1060.2 • 120.10 • 54.05) $C_{50}H_{73}N_{15}O_{11}$ • $2CH_3COOH$ • $3H_2O$			

1) D.F. Elliott, G.P. Lewis, and E.W. Horton, *Biochem. Biophys. Res. Commun.*, **3**, 87 (1960). (*Original; Bovine*)
2) E.D. Nicolaides and H.A. DeWald, *J. Org. Chem.*, **26**, 3872 (1961). (*Chem. Synthesis*)
3) J.V. Pierce and M.E. Webster, *Biochem. Biophys. Res. Commun.*, **5**, 353 (1961). (*Original; Human*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Code	Compound			Price:Yen
4293-v -20℃	**D-Arginyl-[Hyp^3,Thi^5,D-Tic^7,Oic^8]-Bradykinin** **Hoe 140, Icatibant** D-Arg-Arg-Pro-Hyp-Gly-Thi-Ser-D-Tic-Oic-Arg (Thi: L-Thienylalanine, Tic: 1,2,3,4-Tetrahydroisoquinoline-3-carboxylic acid, Oic: (3aS,7aS)-Octahydroindolyl-2-carboxylic acid) (M.W. 1304.5) $C_{59}H_{89}N_{19}O_{13}S$ [130308-48-4]	Vial	0.5 mg	12,000
4293 -20℃	**D-Arginyl-[Hyp^3,Thi^5,D-Tic^7,Oic^8]-Bradykinin** **Hoe 140, Icatibant** D-Arg-Arg-Pro-Hyp-Gly-Thi-Ser-D-Tic-Oic-Arg • 2AcOH • $4H_2O$ (Thi: L-Thienylalanine, Tic: 1,2,3,4-Tetrahydroisoquinoline-3-carboxylic acid, Oic: (3aS,7aS)-Octahydroindolyl-2-carboxylic acid) (M.W. 1304.5 • 120.10 • 72.06) $C_{59}H_{89}N_{19}O_{13}S \cdot 2CH_3COOH \cdot 4H_2O$ [138614-30-9] *Bradykinin B_2-Receptor Antagonist* 1) F.J. Hock, K. Wirth, U. Albus, W. Linz, H.J. Gerhards, G. Wiemer, St. Henke, G. Breipohl, W. König, J. Knolle, and B.A. Schölkens, *Br. J. Pharmacol.*, **102**, 769 (1991). (*Original & Pharmacol.; in vitro*) 2) K. Wirth, F.J. Hock, U. Albus, W. Linz, H.G. Alpermann, H. Anagnostopoulos, S. Henke, G. Breipohl, W. König, J. Knolle, and B.A. Schölkens, *Br. J. Pharmacol.*, **102**, 774 (1991). (*Original & Pharmacol.; in vivo*) 3) A.R. Baydon and B. Woodward, *Br. J. Pharmacol.*, **103**, 1829 (1991). (*Pharmacol.*) 4) G. Wiemer, R. Popp, B.A. Schölkens, and H. Gögelein, *Brain Res.*, **638**, 261 (1994). (*Pharmacol.; Icatibant*)	Bulk	25 mg	152,500
4202-v -20℃	**D-Arginyl-[Hyp^3,Thi^{5,8},D-Phe^7]-Bradykinin** D-Arg-Arg-Pro-Hyp-Gly-Thi-Ser-D-Phe-Thi-Arg (Thi: L-Thienylalanine) (M.W. 1294.5) $C_{56}H_{83}N_{19}O_{13}S_2$ [103412-42-6]	Vial	0.5 mg	4,800
4202 -20℃	**D-Arginyl-[Hyp^3,Thi^{5,8},D-Phe^7]-Bradykinin** D-Arg-Arg-Pro-Hyp-Gly-Thi-Ser-D-Phe-Thi-Arg • 2AcOH • $4H_2O$ (Thi: L-Thienylalanine) (M.W. 1294.5 • 120.10 • 72.06) $C_{56}H_{83}N_{19}O_{13}S_2 \cdot 2CH_3COOH \cdot 4H_2O$ *Bradykinin B_2-Receptor Antagonist* 1) M. Schachter, Y. Uchida, D.J. Longridge, T. Labedz, E.T. Whalley, R.J. Vavrek, and J.M. Stewart, *Br. J. Pharmacol.*, **92**, 851 (1987). (*Original*) 2) J.M. Stewart and R.J. Vavrek, *Adv. Biosci.*, **65**, 73 (1987). (*Pharmacol.; pA_2*) 3) D.C. Perry, *Pharmacol. Biochem. Behav.*, **28**, 15 (1987). (*Pharmacol.; CNS*)	Bulk	25 mg	61,000
4009-v -20℃	**Bradykinin-Potentiator B** **(Mamushi, *Agkistrodon halys blomhoffii*)** Pyr-Gly-Leu-Pro-Pro-Arg-Pro-Lys-Ile-Pro-Pro (M.W. 1182.4) $C_{56}H_{91}N_{15}O_{13}$ [30892-86-5] *Inhibitor for Peptidyl-Dipeptidase A, Kininase II, and Angiotensin Converting Enzyme (ACE)* 1) H. Kato and T. Suzuki, *Biochemistry*, **10**, 972 (1971). (*Original*)	Vial	0.5 mg	2,800

Code	Compound			Price:Yen
4010-v -20℃	**Bradykinin-Potentiator C** **(Mamushi, *Agkistrodon halys blomhoffii*)** Pyr-Gly-Leu-Pro-Pro-Gly-Pro-Pro-Ile-Pro-Pro (M.W. 1052.2) $C_{51}H_{77}N_{11}O_{13}$ [30953-20-9] *Inhibitor for Peptidyl-Dipeptidase A, Kininase II, and Angiotensin Converting Enzyme (ACE)* 1) H. Kato and T. Suzuki, *Biochemistry*, **10**, 972 (1971). (*Original*)	Vial	0.5 mg	2,300
4067-v -20℃	**Des-Arg^9-Bradykinin** Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe (M.W. 904.02) $C_{44}H_{61}N_{11}O_{10}$ [15958-92-6]	Vial	0.5 mg	2,700
4067 -20℃	**Des-Arg^9-Bradykinin** Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe • AcOH • $3H_2O$ (M.W. 904.02 • 60.05 • 54.05) $C_{44}H_{61}N_{11}O_{10}$ • CH_3COOH • $3H_2O$ *Bradykinin B_1-Receptor Agonist* 1) D. Regoli, J. Barabe, and W.K. Park, *Can. J. Physiol. Pharmacol.*, **55**, 855 (1977). (*Original*)	Bulk	25 mg	43,000
4303-v -20℃	**Des-Arg^{10}-Kallidin** **Lysyl-Des-Arg^9-Bradykinin** Lys-Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe (M.W. 1032.2) $C_{50}H_{73}N_{13}O_{11}$ [71800-36-7]	Vial	0.5 mg	2,700
4303 -20℃	**Des-Arg^{10}-Kallidin** **Lysyl-Des-Arg^9-Bradykinin** Lys-Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe • 2AcOH • $4H_2O$ (M.W. 1032.2 • 120.10 • 72.06) $C_{50}H_{73}N_{13}O_{11}$ • $2CH_3COOH$ • $4H_2O$ *Bradykinin B_1-Receptor Agonist* 1) J.P. Galizzi, M.C. Bodinier, B. Chapelain, S.M. Ly, L. Coussy, S. Giraud, G. Neliat, and T. Jean, *Br. J. Pharmacol.*, **113**, 389 (1994). (*Original*) 2) J.G. Menke, J.A. Borkowski, K.K. Bierilo, T. MacNeil, A.W. Derrick, K.A. Schneck, R.W. Ransom, C.D. Strader, D.L. Linemeyer, and J.F. Hess, *J. Biol. Chem.*, **269**, 21583 (1994). (*Pharmacol.*) 3) J.S. Zuzack, M.R. Burkard, D.K. Curdrado, R.A. Greer, W.M. Selig, and E.T. Whalley, *J. Pharmacol. Exp. Ther.*, **277**, 1337 (1996). (*Pharmacol.*)	Bulk	25 mg	43,000
4065-v -20℃	**Des-Arg^9-[Leu^8]-Bradykinin** Arg-Pro-Pro-Gly-Phe-Ser-Pro-Leu (M.W. 870.01) $C_{41}H_{63}N_{11}O_{10}$ [64695-06-3]	Vial	0.5 mg	2,700
4065 -20℃	**Des-Arg^9-[Leu^8]-Bradykinin** Arg-Pro-Pro-Gly-Phe-Ser-Pro-Leu • AcOH • $3H_2O$ (M.W. 870.01 • 60.05 • 54.05) $C_{41}H_{63}N_{11}O_{10}$ • CH_3COOH • $3H_2O$ [115035-45-5] *Bradykinin B_1-Receptor Antagonist* 1) D. Regoli, J. Barabe, and W.K. Park, *Can. J. Physiol. Pharmacol.*, **55**, 855 (1977). (*Original ; pA_2*)	Bulk	25 mg	39,000

Code	Compound			Price:Yen
4097-v -20℃	**Des-Pro^2-Bradykinin** Arg-Pro-Gly-Phe-Ser-Pro-Phe-Arg (M.W. 963.09) $C_{45}H_{66}N_{14}O_{10}$ [80943-05-1]	Vial	0.5 mg	2,800
4097 -20℃	**Des-Pro^2-Bradykinin** Arg-Pro-Gly-Phe-Ser-Pro-Phe-Arg • 2AcOH • $3H_2O$ (M.W. 963.09 • 120.10 • 54.05) $C_{45}H_{66}N_{14}O_{10}$ • $2CH_3COOH$ • $3H_2O$ Purity Information : Qp See page IV (XVI) *Inhibitor for Peptidyl-Dipeptidase A, Kininase II, and Angiotensin Converting Enzyme (ACE)* 1) M. Naruse, S. Tamanami, K. Shuto, S. Sakakibara, and T. Kimura, *Chem. Pharm. Bull.*, **29**, 3369 (1981). (*Original*)	Bulk	25 mg	43,000
4193-v -20℃	**[Hyp^3]-Bradykinin*** **(Human)** Arg-Pro-Hyp-Gly-Phe-Ser-Pro-Phe-Arg (M.W. 1076.2) $C_{50}H_{73}N_{15}O_{12}$ [37642-65-2] 1) H. Kato, Y. Matsumura, and H. Maeda, *FEBS Lett.*, **232**, 252 (1988). (*Original*)	Vial	0.5 mg	3,200
4130-v -20℃	**Isoleucyl-Seryl-Bradykinin*** **T-Kinin** **(Rat)** Ile-Ser-Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe-Arg (M.W. 1260.4) $C_{59}H_{89}N_{17}O_{14}$ [86030-63-9]	Vial	0.5 mg	3,300
4130 -20℃	**Isoleucyl-Seryl-Bradykinin*** **T-Kinin** **(Rat)** Ile-Ser-Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe-Arg • 2AcOH • $5H_2O$ (M.W. 1260.4 • 120.10 • 90.08) $C_{59}H_{89}N_{17}O_{14}$ • $2CH_3COOH$ • $5H_2O$ 1) H. Okamoto and L.M. Greenbaum, *Biochem. Biophys. Res. Commun.*, **112**, 701 (1983). (*Original*)	Bulk	25 mg	47,000
4008-v -20℃	**Lysyl-Bradykinin*** **Kallidin** **(Human, Bovine)** Lys-Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe-Arg (M.W. 1188.4) $C_{56}H_{85}N_{17}O_{12}$ [342-10-9]	Vial	0.5 mg	3,100
4008 -20℃	**Lysyl-Bradykinin*** **Kallidin** **(Human, Bovine)** Lys-Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe-Arg • 3AcOH • $4H_2O$ (M.W. 1188.4 • 180.16 • 72.06) $C_{56}H_{85}N_{17}O_{12}$ • $3CH_3COOH$ • $4H_2O$ [100900-38-7] 1) J.V. Pierce and M.E. Webster, *Biochem. Biophys. Res. Commun.*, **5**, 353 (1961). (*Original; Human*) 2) D.F. Elliott and G.P. Lewis, *Biochem. J.*, **95**, 437 (1965). (*Seq.; Bovine*)	Bulk	25 mg	36,000

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Code	Compound			Price:Yen
4191-v -20℃	**Lysyl-[Hyp^3]-Bradykinin*** **(Human)** Lys-Arg-Pro-Hyp-Gly-Phe-Ser-Pro-Phe-Arg (M.W. 1204.4) $C_{56}H_{85}N_{17}O_{13}$ 1) M. Sasaguri, M. Ikeda, M. Ideishi, and K. Arakawa, *Biochem. Biophys. Res. Commun.*, **150**, 511 (1988). (*Original*)	Vial	0.5 mg	3,400
4012-v -20℃	**Methionyl-Lysyl-Bradykinin*** **(Human, Bovine)** Met-Lys-Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe-Arg (M.W. 1319.6) $C_{61}H_{94}N_{18}O_{13}S$ [550-19-6]	Vial	0.5 mg	3,300
4012 -20℃	**Methionyl-Lysyl-Bradykinin*** **(Human, Bovine)** Met-Lys-Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe-Arg • 3AcOH • $2H_2O$ (M.W. 1319.6 • 180.16 • 36.03) $C_{61}H_{94}N_{18}O_{13}S \cdot 3CH_3COOH \cdot 2H_2O$ 1) D.F. Elliott and G.P. Lewis, *Biochem. J.*, **95**, 437 (1965). (*Original; Bovine*) 2) I. Ohkubo, K. Kurachi, T. Takasawa, H. Shiokawa, and M. Sasaki, *Biochemistry*, **23**, 5691 (1984). (*cDNA Seq.; Human*)	Bulk	25 mg	43,000
4175-v -20℃	**[Thi^{5,8},D-Phe^7]-Bradykinin** Arg-Pro-Pro-Gly-Thi-Ser-D-Phe-Thi-Arg (Thi: L-Thienylalanine) (M.W. 1122.3) $C_{50}H_{71}N_{15}O_{11}S_2$ [97825-07-5] *Bradykinin B_2-Receptor Antagonist* 1) R.J. Vavrek and J.M. Stewart, *Peptides*, **6**, 161 (1985). (*Original*)	Vial	0.5 mg	4,100
4075-v -20℃	**[Tyr^8]-Bradykinin** Arg-Pro-Pro-Gly-Phe-Ser-Pro-Tyr-Arg (M.W. 1076.2) $C_{50}H_{73}N_{15}O_{12}$ [32222-00-7] *For Radioimmunoassay* 1) M.D. Nielsen, F. Nielsen, A.M. Kappelgaard, and J. Giese, *Clinica Chimica Acta*, **125**, 145 (1982). (*Radioimmunoassay*) 2) M.J. Fredrick, F.C. Abel, W.A. Rightsel, E.E. Muirhead, and C.E. Odya, *Life Sci.*, **37**, 331 (1985). (*Radioimmunoassay*)	Vial	0.5 mg	3,500
4056-v -20℃	**Tyrosyl-Bradykinin** Tyr-Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe-Arg (M.W. 1223.4) $C_{59}H_{82}N_{16}O_{13}$ [33289-76-8] *For Radioimmunoassay* 1) R.E. Lewis, S.R. Childers, and M.I. Phillips, *Brain Res.*, **346**, 263 (1985). (*Radioimmunoassay*) 2) M.J. Fredrick, F.C. Abel, W.A. Rightsel, E.E. Muirhead, and C.E. Odya, *Life Sci.*, **37**, 331 (1985). (*Radioimmunoassay*)	Vial	0.5 mg	3,200

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

1) A. Rosenzweig and C.E. Seidman, *Annu. Rev. Biochem.*, **60**, 229 (1991). (*Review*)

Code	Compound			Price:Yen
4212-v -20℃	**BNP-32 (Human)***	Vial	0.5 mg	41,000

B-type (Brain) Natriuretic Peptide-32 (Human)
Ser-Pro-Lys-Met-Val-Gln-Gly-Ser-Gly-Cys-Phe-Gly-Arg-Lys-Met-Asp-Arg-Ile-Ser-Ser-Ser-Ser-Gly-Leu-Gly-Cys-Lys-Val-Leu-Arg-Arg-His
(Disulfide bond between Cys^{10}-Cys^{26})
(M.W. 3464.0) $C_{143}H_{244}N_{50}O_{42}S_4$ [124584-08-3]

1) T. Sudoh, K. Maekawa, M. Kojima, N. Minamino, K. Kangawa, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **159,** 1427 (1989). (*Original; cDNA*)
2) Y. Kambayashi, K. Nakao, M. Mukoyama, Y. Saito, Y. Ogawa, S. Shiono, K. Inouye, N. Yoshida, and H. Imura, *FEBS Lett.*, **259**, 341 (1990). (*Original; Isolation & Structure*)

4230-v -20℃	**Tyrosyl-BNP-32 (Human)***	Vial	0.5 mg	48,000

Tyrosyl-B-type (Brain) Natriuretic Peptide-32 (Human)
Tyr-Ser-Pro-Lys-Met-Val-Gln-Gly-Ser-Gly-Cys-Phe-Gly-Arg-Lys-Met-Asp-Arg-Ile-Ser-Ser-Ser-Ser-Gly-Leu-Gly-Cys-Lys-Val-Leu-Arg-Arg-His
(Disulfide bond between Cys^{10}-Cys^{26})
(M.W. 3627.2) $C_{152}H_{253}N_{51}O_{44}S_4$
Purity Information : Qx See page IV (XVI)

For Radioimmunoassay

4200-v -20℃	**BNP-26 (Porcine)***	Vial	0.5 mg	41,000

B-type (Brain) Natriuretic Peptide-26 (Porcine)
Asp-Ser-Gly-Cys-Phe-Gly-Arg-Arg-Leu-Asp-Arg-Ile-Gly-Ser-Leu-Ser-Gly-Leu-Gly-Cys-Asn-Val-Leu-Arg-Arg-Tyr
(Disulfide bond between Cys^{4}-Cys^{20})
(M.W. 2869.2) $C_{120}H_{198}N_{42}O_{36}S_2$ [114547-28-3]

1) T. Sudoh, K. Kangawa, N. Minamino, and H. Matsuo, *Nature*, **332**, 78 (1988). (*Original*)

4213-v -20℃	**BNP-32 (Rat)***	Vial	0.5 mg	41,000

B-type (Brain) Natriuretic Peptide-32 (Rat)
Asn-Ser-Lys-Met-Ala-His-Ser-Ser-Ser-Cys-Phe-Gly-Gln-Lys-Ile-Asp-Arg-Ile-Gly-Ala-Val-Ser-Arg-Leu-Gly-Cys-Asp-Gly-Leu-Arg-Leu-Phe
(Disulfide bond between Cys^{10}-Cys^{26})
(M.W. 3452.9) $C_{146}H_{239}N_{47}O_{44}S_3$ [133448-20-1]

1) M. Kojima, N. Minamino, K. Kangawa, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **159**, 1420 (1989). (*Original; cDNA*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

B-type (Brain) Natriuretic Peptides (BNP) (continued)

Code	Compound			Price:Yen
4218-s -20℃	**BNP-45 (Rat)***	Vial	0.1 mg	14,000

B-type (Brain) Natriuretic Peptide-45 (Rat)
Ser-Gln-Asp-Ser-Ala-Phe-Arg-Ile-Gln-Glu-Arg-Leu-Arg-Asn-Ser-Lys-Met-Ala-His-Ser-Ser-Ser-Cys-Phe-Gly-Gln-Lys-Ile-Asp-Arg-Ile-Gly-Ala-Val-Ser-Arg-Leu-Gly-Cys-Asp-Gly-Leu-Arg-Leu-Phe
(Disulfide bond between Cys^{23}-Cys^{39})
(M.W. 5040.7) $C_{213}H_{349}N_{71}O_{65}S_3$ [123337-89-3]

1) M. Aburaya, J. Hino, N. Minamino, K. Kangawa, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **163**, 226 (1989). (*Original*)
2) Y. Kambayashi, K. Nakao, H. Itoh, K. Hosoda, Y. Saito, T. Yamada, M. Mukoyama, H. Arai, G. Shirakami, S. Suga, Y. Ogawa, M. Jougasaki, N. Minamino, K. Kangawa, H. Matsuo, K. Inouye, and H. Imura, *Biochem. Biophys. Res. Commun.*, **163**, 233 (1989). (*Original*)

Calcicludine

4310-s -20℃	**Calcicludine***	Vial	0.1 mg	30,000

CaC
(Green Mamba, *Dendroaspis angusticeps*)
Trp-Gln-Pro-Pro-Trp-Tyr-Cys-Lys-Glu-Pro-Val-Arg-Ile-Gly-Ser-Cys-Lys-Lys-Gln-Phe-Ser-Ser-Phe-Tyr-Phe-Lys-Trp-Thr-Ala-Lys-Lys-Cys-Leu-Pro-Phe-Leu-Phe-Ser-Gly-Cys-Gly-Gly-Asn-Ala-Asn-Arg-Phe-Gln-Thr-Ile-Gly-Glu-Cys-Arg-Lys-Lys-Cys-Leu-Gly-Lys
(Disulfide bonds between Cys^7-Cys^{57}, Cys^{16}-Cys^{40}, and Cys^{32}-Cys^{53})
(M.W. 6980.1) $C_{321}H_{476}N_{86}O_{78}S_6$

Neuronal L-type Ca^{2+} Channel Blocker

1) H. Schweitz, C. Heurteaux, P. Bois, D. Moinier, G. Romey, and M. Lazdunski, *Proc. Natl. Acad. Sci. U.S.A.*, **91**, 878 (1994). (*Original*)
2) H. Nishio, Y. Nishiuchi, T. Inui, M. Nakao, T.X. Watanabe, T. Kimura, and S. Sakakibara, *Peptide Chemistry 1995*, 113 (1996). (*Chem. Synthesis & Pharmacol.*)
3) O.D. Uchitel, *Toxicon*, **35**, 1161 (1997). (*Review*)
4) J. Santos-Torres, A. Fuente, J.M. Criado, A.S. Riolobos, M. Heredia, and J. Yajeya, *J. Neurosci. Res.*, **85**, 634 (2007). (*Pharmacol.*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Calciseptine

Code	Compound			Price:Yen
4255-s -20℃	**Calciseptine***	Vial	0.1 mg	30,000

(Black Mamba, *Dendroaspis polylepis polylepis*)
Arg-Ile-Cys-Tyr-Ile-His-Lys-Ala-Ser-Leu-
Pro-Arg-Ala-Thr-Lys-Thr-Cys-Val-Glu-Asn-
Thr-Cys-Tyr-Lys-Met-Phe-Ile-Arg-Thr-Gln-
Arg-Glu-Tyr-Ile-Ser-Glu-Arg-Gly-Cys-Gly-
Cys-Pro-Thr-Ala-Met-Trp-Pro-Tyr-Gln-Thr-
Glu-Cys-Cys-Lys-Gly-Asp-Arg-Cys-Asn-Lys
(Disulfide bonds between Cys^{3}-Cys^{22}, Cys^{17}-Cys^{39}, Cys^{41}-Cys^{52}, and Cys^{53}-Cys^{58})
(M.W. 7036.1) $C_{299}H_{468}N_{90}O_{87}S_{10}$ [134710-25-1]

L-type Ca^{2+} Channel Blocker

1) J.R. De Weille, H. Schweitz, P. Maes, A. Tartar, and M. Lazdunski, *Proc. Natl. Acad. Sci. U.S.A.*, **88**, 2437 (1991). (*Original*)
2) H. Kuroda, Y.-N. Chen, T.X. Watanabe, T. Kimura, and S. Sakakibara, *Pept. Res.*, **5**, 265 (1992). (*Chem. Synthesis*)
3) T.X. Watanabe, Y. Itahara, H. Kuroda, Y.-N. Chen, T. Kimura, and S. Sakakibara, *Jpn. J. Pharmacol.*, **68**, 305, (1995). (*Pharmacol.*)
4) N. Teramoto, R. Ogata, K. Okabe, A. Kameyama, M. Kameyama, T.X. Watanabe, H. Kuriyama, and K. Kitamura, *Pflügers Arch.*, **432**, 462 (1996). (*Pharmacol.*)

Calcitonin

Code	Compound			Price:Yen
4051-s -20℃	**Calcitonin (Human)**	Vial	0.1 mg	9,000

Cys-Gly-Asn-Leu-Ser-Thr-Cys-Met-Leu-Gly-
Thr-Tyr-Thr-Gln-Asp-Phe-Asn-Lys-Phe-His-
Thr-Phe-Pro-Gln-Thr-Ala-Ile-Gly-Val-Gly-
Ala-Pro-NH_2
(Disulfide bond between Cys^{1}-Cys^{7})
(M.W. 3417.8) $C_{151}H_{226}N_{40}O_{45}S_{3}$ [21215-62-3]

Code	Compound			Price:Yen
4051-v -20℃	**Calcitonin (Human)**	Vial	0.5 mg	27,000

1) R. Neher, B. Riniker, W. Rittel, and H. Zuber, *Helv. Chim. Acta*, **51**, 1900 (1968). (*Original*)
2) Y. Nakagawa, T. Morikawa, and S. Sakakibara, *Peptide Chemistry 1977*, 189 (1978). (*Chem. Synthesis*)

Calcitonin Gene Related Peptides See page 34 and 35

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

CART

1) P.J. Larsen and R.G. Hunter, *Peptides*, **27**, 1981 (2006). (*Review*)
2) A. Vicentic and D.C. Jones, *J. Pharmacol. Exp. Ther.*, **320**, 499 (2007). (*Review*)

Code	Compound			Price:Yen
4350-s -20℃	**CART (Human, 55-102)** **Cocaine- and Amphetamine-Regulated Transcript (Human, 55-102)** Val-Pro-Ile-Tyr-Glu-Lys-Lys-Tyr-Gly-Gln- Val-Pro-Met-Cys-Asp-Ala-Gly-Glu-Gln-Cys- Ala-Val-Arg-Lys-Gly-Ala-Arg-Ile-Gly-Lys- Leu-Cys-Asp-Cys-Pro-Arg-Gly-Thr-Ser-Cys- Asn-Ser-Phe-Leu-Leu-Lys-Cys-Leu (Disulfide bonds between Cys^{68}-Cys^{86}, Cys^{74}-Cys^{94}, and Cys^{88}-Cys^{101}) (M.W. 5245.2) $C_{225}H_{365}N_{65}O_{65}S_7$ [214050-22-3] *Food-Intake Inhibitor*	Vial	0.1 mg	30,000

1) P. Kristensen, M.E. Judge, L. Thim, U. Ribel, K.N. Christjansen, B.S. Wulff, J.T. Clausen, P.B. Jensen, O.D. Madsen, N. Vrang, P.J. Larsen, and S. Hastrup, *Nature*, **393**, 72 (1998). (*Pharmacol.; Anorectic Peptide*)
2) J. Douglass and S. Daoud, *Gene*, **169**, 241 (1996). (*Original; cDNA*)
3) A.J. Kastin and V. Akerstrom, *Am. J. Physiol.*, **277**, E901 (1999). (*Pharmacol.; across BBB*)
4) M.J. Kuhar, L.D. Adams, R.G. Hunter, S. Dall Vechia, and Y. Smith, *Regul. Pept.*, **89**, 1 (2000). (*Review*)

Code	Compound			Price:Yen
4351-s -20℃	**CART (Rat, 55-102)** **Cocaine- and Amphetamine-Regulated Transcript (Rat, 55-102)** Ile-Pro-Ile-Tyr-Glu-Lys-Lys-Tyr-Gly-Gln- Val-Pro-Met-Cys-Asp-Ala-Gly-Glu-Gln-Cys- Ala-Val-Arg-Lys-Gly-Ala-Arg-Ile-Gly-Lys- Leu-Cys-Asp-Cys-Pro-Arg-Gly-Thr-Ser-Cys- Asn-Ser-Phe-Leu-Leu-Lys-Cys-Leu (Disulfide bonds between Cys^{68}-Cys^{86}, Cys^{74}-Cys^{94}, and Cys^{88}-Cys^{101}) (M.W. 5259.2) $C_{226}H_{367}N_{65}O_{65}S_7$ [209615-79-2] *Food-Intake Inhibitor*	Vial	0.1 mg	30,000

1) P. Kristensen, M.E. Judge, L. Thim, U. Ribel, K.N. Christjansen, B.S. Wulff, J.T. Clausen, P.B. Jensen, O.D. Madsen, N. Vrang, P.J. Larsen, and S. Hastrup, *Nature*, **393**, 72 (1998). (*Pharmacol.; Anorectic Peptide*)
2) J. Douglass, A.A. McKinzie, and P. Couceyro, *J. Neurosci.*, **15**, 2471 (1995). (*Original; cDNA*)
3) L. Thim, P.F. Nielsen, M.E. Judge, A.S. Andersen, I. Diers, M. Egel-Mitani, and S. Hastrup, *FEBS Lett.*, **428**, 263 (1998). (*Biochem. & Pharmacol.*)
4) M.J. Kuhar, L.D. Adams, R.G. Hunter, S. Dall Vechia, and Y. Smith, *Regul. Pept.*, **89**, 1 (2000). (*Review*)

β-Casomorphins

Code	Compound			Price:Yen
4079-v -20℃	**β-Casomorphin-5 (Bovine)** Tyr-Pro-Phe-Pro-Gly (M.W. 579.64) $C_{30}H_{37}N_5O_7$ [72122-63-5]	Vial	0.5 mg	2,100
4079 -20℃	**β-Casomorphin-5 (Bovine)** Tyr-Pro-Phe-Pro-Gly • $2H_2O$ (M.W. 579.64 • 36.03) $C_{30}H_{37}N_5O_7$ • $2H_2O$ [72122-63-5]	Bulk	25 mg 100 mg	16,000 47,000

1) V. Brantl, H. Teschemacher, A. Henschen, and F. Lottspeich, *Hoppe-Seyler's Z. Physiol. Chem.*, **360**, 1211 (1979). (*Original; Isolation*)
2) A. Henschen, F. Lottspeich, V. Brantl, and H. Teschemacher, *Hoppe-Seyler's Z. Physiol. Chem.*, **360**, 1217 (1979). (*Original; Structure*)

β-Casomorphins (continued)

Code	Compound			Price:Yen
4078-v -20℃	**β-Casomorphin-7 (Bovine)** Tyr-Pro-Phe-Pro-Gly-Pro-Ile (M.W. 789.92) $C_{41}H_{55}N_7O_9$ [72122-62-4] 1) V. Brantl, H. Teschemacher, A. Henschen, and F. Lottspeich, *Hoppe-Seyler's Z. Physiol. Chem.*, **360**, 1211 (1979). (*Original; Isolation*) 2) A. Henschen, F. Lottspeich, V. Brantl, and H. Teschemacher, *Hoppe-Seyler's Z. Physiol. Chem.*, **360**, 1217 (1979). (*Original; Structure*)	Vial	0.5 mg	2,700

CCK See page 36 and 37

CGP 42112 See Code 4296 on page 18

CGRP

Code	Compound			Price:Yen
4160-s -20℃	**CGRP (Human)*** **Calcitonin Gene Related Peptide (Human)** **α-CGRP (Human)** Ala-Cys-Asp-Thr-Ala-Thr-Cys-Val-Thr-His-Arg-Leu-Ala-Gly-Leu-Leu-Ser-Arg-Ser-Gly-Gly-Val-Val-Lys-Asn-Asn-Phe-Val-Pro-Thr-Asn-Val-Gly-Ser-Lys-Ala-Phe-NH_2 (Disulfide bond between Cys^2-Cys^7) (M.W. 3789.3) $C_{163}H_{267}N_{51}O_{49}S_2$ [90954-53-3]	Vial	0.1 mg	11,500
4160-v -20℃	**CGRP (Human)*** **Calcitonin Gene Related Peptide (Human)** **α-CGRP (Human)** 1) H.R. Morris, M. Panico, T. Etienne, J. Tippins, S.I. Girgis, and I. MacIntyre, *Nature*, **308**, 746 (1984). (*Original*) • This compound is distributed through Peptide Institute, Inc. under the license of The Salk Institute. However, it is no longer available in the United Kingdom due to the patent rights held by Celltech Ltd.	Vial	0.5 mg	35,000
4232-v -20℃	**CGRP (Human, 8-37)*** **Calcitonin Gene Related Peptide (Human, 8-37)** **α-CGRP (Human, 8-37)** Val-Thr-His-Arg-Leu-Ala-Gly-Leu-Leu-Ser-Arg-Ser-Gly-Gly-Val-Val-Lys-Asn-Asn-Phe-Val-Pro-Thr-Asn-Val-Gly-Ser-Lys-Ala-Phe-NH_2 (M.W. 3125.6) $C_{139}H_{230}N_{44}O_{38}$ [119911-68-1] *CGRP Antagonist* 1) T. Chiba, A. Yamaguchi, T. Yamatani, A. Nakamura, T. Morishita, T. Inui, M. Fukase, T. Noda, and T. Fujita, *Am. J. Physiol.*, **256**, E331 (1989). (*Original*) 2) S.-P. Han, L. Naes, and T.C. Westfall, *Biochem. Biophys. Res. Commun.*, **168**, 786 (1990). (*Pharmacol.*) 3) T. Dennis, A. Fournier, A. Cadieux, F. Pomerleau, F.B. Jolicoeur, S.St. Pierre, and R. Quirion, *J. Pharmacol. Exp. Ther.*, **254**, 123 (1990). (*Pharmacol.*) 4) S.M. Gardiner, A.M. Compton, P.A. Kemp, T. Bennett, C. Bose, R. Foulkes, and B. Hughes, *Biochem. Biophys. Res. Commun.*, **171**, 938 (1990). (*Pharmacol.*)	Vial	0.5 mg	22,000

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

CGRP (continued)

Code	Compound			Price:Yen
4163-s -20℃	**CGRP (Rat)*** **Calcitonin Gene Related Peptide (Rat)** **α-CGRP (Rat)** Ser-Cys-Asn-Thr-Ala-Thr-Cys-Val-Thr-His-Arg-Leu-Ala-Gly-Leu-Leu-Ser-Arg-Ser-Gly-Gly-Val-Val-Lys-Asp-Asn-Phe-Val-Pro-Thr-Asn-Val-Gly-Ser-Glu-Ala-Phe-NH_2 (Disulfide bond between Cys^2-Cys^7) (M.W. 3806.2) $C_{162}H_{262}N_{50}O_{52}S_2$ [83651-90-5]	Vial	0.1 mg	11,500
4163-v -20℃	**CGRP (Rat)*** **Calcitonin Gene Related Peptide (Rat)** **α-CGRP (Rat)**	Vial	0.5 mg	35,000

1) S.G. Amara, V. Jonas, M.G. Ronsenfeld, E.S. Ong, and R.M. Evans, *Nature*, **298**, 240 (1982). (*Original*)
2) M.G. Rosenfeld, J.-J. Mermod, S,G. Amara, L.W. Swanson, P.E. Sawchenko, J. Rivier, W.W. Vale, and R.M. Evans, *Nature*, **304**, 129 (1983). (*Processing & Distribution in Neural Tissue*)

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Charybdotoxin

1) M.L. Garcia, H.-G. Knaus, P. Munujos, R.S. Slaughter, and G.J. Kaczorowski, *Am. J. Physiol.*, **269**, C1 (1995). (*Review*)

4227-s -20℃	**Charybdotoxin*** **ChTX** **(Scorpion, *Leiurus quinquestriatus hebraeus*)** Pyr-Phe-Thr-Asn-Val-Ser-Cys-Thr-Thr-Ser-Lys-Glu-Cys-Trp-Ser-Val-Cys-Gln-Arg-Leu-His-Asn-Thr-Ser-Arg-Gly-Lys-Cys-Met-Asn-Lys-Lys-Cys-Arg-Cys-Tyr-Ser (Disulfide bonds between Cys^7-Cys^{28}, Cys^{13}-Cys^{33}, and Cys^{17}-Cys^{35}) (M.W. 4295.9) $C_{176}H_{277}N_{57}O_{55}S_7$ [95751-30-7]	Vial	0.1 mg	22,000

Ca^{2+}-Activated K^+ Channel Blocker

1) G. Gimenez-Gallego, M.A. Navia, J.P. Reuben, G.M. Katz, G.J. Kaczorowski, and M.L. Garcia, *Proc. Natl. Acad. Sci. U.S.A.*, **85**, 3329 (1988). (*Original*)
2) P. Lambert, H. Kuroda, N. Chino, T.X. Watanabe, T. Kimura, and S. Sakakibara, *Biochem. Biophys. Res. Commun.*, **170**, 684 (1990). (*Chem. Synthesis & Pharmacol.*)

Chemotactic Peptide

4066-v -20℃	**Chemotactic Peptide** **For-Met-Leu-Phe** **FMLP** (M.W. 437.55) $C_{21}H_{31}N_3O_5S$ [59880-97-6]	Vial	0.5 mg	2,400
4066 -20℃	**Chemotactic Peptide** **For-Met-Leu-Phe** **FMLP** (M.W. 437.55) $C_{21}H_{31}N_3O_5S$ [59880-97-6]	Bulk	25 mg 100 mg	8,000 24,000

1) L.T. Williams, R. Snyderman, M.C. Pike, and R.J. Lefkowitz, *Proc. Natl. Acad. Sci. U.S.A.*, **74**, 1204 (1977). (*Receptor Site on Human Leukocyte*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Chlorotoxin

Code	Compound			Price:Yen
4282-v -20℃	**Chlorotoxin** **(Scorpion, *Leiurus quinquestriatus*)** Met-Cys-Met-Pro-Cys-Phe-Thr-Thr-Asp-His-Gln-Met-Ala-Arg-Lys-Cys-Asp-Asp-Cys-Cys-Gly-Gly-Lys-Gly-Arg-Gly-Lys-Cys-Tyr-Gly-Pro-Gln-Cys-Leu-Cys-Arg-NH_2 (Reported disulfide bonds between Cys^{2}-Cys^{19}, Cys^{5}-Cys^{28}, Cys^{16}-Cys^{33}, and Cys^{20}-Cys^{35}) (M.W. 3995.7) $C_{158}H_{249}N_{53}O_{47}S_{11}$ [163515-35-3] *Small-Conductance Cl^- Channel Blocker*	Vial	0.5 mg	45,000

1) J.A. DeBin, J.E. Maggio, and G.R. Strichartz, *Am. J. Physiol.*, **264**, C361 (1993). (*Original*)
2) J. Najib, P. Sautière, J.C. Gesquière, and A. Tartar, *In*, Inovation and Perspective in Solid Phase Synthesis, (R. Epton, ed.), Mayflower Worldwide, Birmingham, 1994, pp. 615-618. (*Original; Amide*)
3) G. Lippens, J. Najib, S.J. Wodak, and A. Tartar, *Biochemistry*, **34**, 13 (1995). (*NMR Structure*)
4) L. Soroceanu, Y. Gillespie, M.B. Khazaeli, and H. Sontheimer, *Cancer Res.*, **58**, 4871 (1998). (*Pharmacol.*)
5) D.B. Jacoby, E. Dyskin, M. Yalcin, K. Kesavan, W. Dahlberg, J. Ratliff, E.W. Johnson, and S.A. Mousa, *Anticancer Res.*, **30**, 39 (2010). (*Review*)
6) K. Kesavan, J. Ratliff, E.W. Johnson, W. Dahlberg, J.M. Asara, P. Misra, J.V. Frangioni, and D.B. Jacoby, *J. Biol. Chem.*, **285**, 4366 (2010). (*Review*)

Cholecystokinin (CCK) and Related Peptides

1) J.E. Jorpes and V. Mutt (eds.), Secretin, Cholecystokinin, Pancreozymin and Gastrin, *Handbook of Experimental Pharmacology*, **Vol. 34**, Springer-Verlag, Berlin, 1973. (*Review*)

Code	Compound			Price:Yen
4083-v -20℃	**CCK-Tetrapeptide (30-33)*** **CCK-4** (Hydrochloride Form) Trp-Met-Asp-Phe-NH_2 (M.W. 596.70) $C_{29}H_{36}N_6O_6S$	Vial	0.5 mg	2,100
4083 -20℃	**CCK-Tetrapeptide (30-33)*** **CCK-4** Trp-Met-Asp-Phe-NH_2 • HCl • H_2O (M.W. 596.70• 36.46 • 18.02) $C_{29}H_{36}N_6O_6S$ • HCl • H_2O [5609-49-4]	Bulk	25 mg 100 mg	9,000 27,000

1) J.F. Rehfeld, L.I. Larsson, N.R. Goltermann, T.W. Schwarz, J.J. Holst, S.L. Jensen, and J.S. Morley, *Nature*, **284**, 33 (1980). (*Neural Pharmacol.*)

Code	Compound			Price:Yen
4087-v -20℃	**CCK-Octapeptide (26-33) (Non-Sulfated Form)*** **CCK-8 (Non-Sulfated Form)** (Ammonium Form) Asp-Tyr-Met-Gly-Trp-Met-Asp-Phe-NH_2 (M.W. 1063.2) $C_{49}H_{62}N_{10}O_{13}S_2$ [25679-24-7]	Vial	0.5 mg	5,000

1) M.A. Ondetti, J. Pluscec, E.F. Sabo, J.T. Sheehan, and N. Williams, *J. Am. Chem. Soc.*, **92**, 195 (1970). (*Chem. Synthesis*)

Code	Compound			Price:Yen
4100-v -20℃	**CCK-Octapeptide (26-33) (Sulfated Form)*** **CCK-8 (Sulfated Form)** (Ammonium Form) Asp-Tyr(SO_3H)-Met-Gly-Trp-Met-Asp-Phe-NH_2 (M.W. 1143.3) $C_{49}H_{62}N_{10}O_{16}S_3$ [25126-32-3]	Vial	0.5 mg	12,000

1) M.A. Ondetti, J. Pluscec, E.F. Sabo, J.T. Sheehen, and N. Williams, *J. Am. Chem. Soc.*, **92**, 195 (1970). (*Chem. Synthesis*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Cholecystokinin (CCK) and Related Peptides (continued)

Code	Compound			Price:Yen
4201-s -20℃	**CCK-33 (Human)***	Vial	0.1 mg	43,000

Lys-Ala-Pro-Ser-Gly-Arg-Met-Ser-Ile-Val-Lys-Asn-Leu-Gln-Asn-Leu-Asp-Pro-Ser-His-Arg-Ile-Ser-Asp-Arg-Asp-Tyr(SO_3H)-Met-Gly-Trp-Met-Asp-Phe-NH_2

(M.W. 3945.4) $C_{167}H_{263}N_{51}O_{52}S_4$ [96827-04-2]

1) Y. Takahashi, K. Kato, Y. Hayashizaki, and K. Matsubara, *Proc. Natl. Acad. Sci. U.S.A.*, **82**, 1931 (1987). (*Original; Nucleotide Seq.*)
2) Y. Kurano, T. Kimura, and S. Sakakibara, *In*, Peptides, Proceedings of the 10th American Peptide Symposium, (G.R. Marshall, ed.), ESCOM Science Publishers B.V. 1988, pp.162-165. (*Chem. Synthesis*)

4176-s -20℃	**CCK-33 (Porcine)***	Vial	0.1 mg	43,000

Lys-Ala-Pro-Ser-Gly-Arg-Val-Ser-Met-Ile-Lys-Asn-Leu-Gln-Ser-Leu-Asp-Pro-Ser-His-Arg-Ile-Ser-Asp-Arg-Asp-Tyr(SO_3H)-Met-Gly-Trp-Met-Asp-Phe-NH_2

(M.W. 3918.4) $C_{166}H_{262}N_{50}O_{52}S_4$ [67256-27-3]

1) V. Mutt and J.E. Jorpes, *Eur. J. Biochem.*, **6**, 156 (1968). (*Original; Partial Structure*)
2) V. Mutt and J.E. Jorpes, *Biochem. J.*, **125**, 57P (1971). (*Original*)
3) Y. Kurano, T. Kimura, and S. Sakakibara, *J. Chem. Soc. Chem. Commun.*, **5**, 323 (1987). (*Chem. Synthesis*)

Chromogranin A (Human, 286-301 Amide) See Code 4214 on page 117

CINC-1/gro

4233-v -20℃	**CINC-1/gro (Rat)** **Cytokine-Induced Neutrophil Chemoattractant-1/ growth-related oncogene (Rat)**	Vial	20 µg	30,000

Ala-Pro-Val-Ala-Asn-Glu-Leu-Arg-Cys-Gln-Cys-Leu-Gln-Thr-Val-Ala-Gly-Ile-His-Phe-Lys-Asn-Ile-Gln-Ser-Leu-Lys-Val-Met-Pro-Pro-Gly-Pro-His-Cys-Thr-Gln-Thr-Glu-Val-Ile-Ala-Thr-Leu-Lys-Asn-Gly-Arg-Glu-Ala-Cys-Leu-Asp-Pro-Glu-Ala-Pro-Met-Val-Gln-Lys-Ile-Val-Gln-Lys-Met-Leu-Lys-Gly-Val-Pro-Lys

(Disulfide bonds between Cys^9-Cys^{35} and Cys^{11}-Cys^{51})

(M.W. 7845.3) $C_{343}H_{572}N_{98}O_{97}S_7$

1) K. Watanabe, K. Konishi, M. Fujioka, S. Kinoshita, and H. Nakagawa, *J. Biol. Chem.*, **264**, 19559 (1989). (*Original*)
2) Y. Nishiuchi, M. Tsunemi, S. Kumagaye, S. Kubo, H. Nishio, K. Watanabe, T. Kinoshita, and S. Sakakibara, *In*, Peptides: Chemistry and Biology (Proceedings of the 12th American Peptide Symposium) (J.A. Smith and J.E. Rivier, eds.), ESCOM, Leiden, 1992, pp.911-913. (*Chem. Synthesis*)
3) H. Nakagawa, N. Komorita, F. Shibata, A. Ikesue, K. Konishi, M. Fujioka, and H. Kato, *Biochem. J.*, **301**, 545 (1994). (*CINC Family*)

CNP See page 44 and 45

Cocaine- and Amphetamine-Regulated Transcript (Human, 55-102)
See Code 4350 **CART (Human, 55-102)** on page 33

Cocaine- and Amphetamine-Regulated Transcript (Rat, 55-102)
See Code 4351 **CART (Rat, 55-102)** on page 33

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Conantokins

1) W.R. Gray, B.M. Olivera, and L.J. Cruz, *Annu. Rev. Biochem.*, **57**, 665 (1988). (*Review*)
2) R.T. Layer, J.D. Wagstaff, and H.S. White, *Curr. Med. Chem.*, **11**, 3073 (2004). (*Review*)

Code	Compound			Price:Yen
4265-v	**Conantokin G**	Vial	0.5 mg	18,000

-20℃

(Marine Snail, *Conus geographus*)
Gly-Glu-Gla-Gla-Leu-Gln-Gla-Asn-Gln-Gla-Leu-Ile-Arg-Gla-Lys-Ser-Asn-NH_2
(Gla: L-γ-Carboxyglutamic acid)
(M.W. 2264.2) $C_{88}H_{138}N_{26}O_{44}$ [93438-65-4]
Purity Information : Qz See page IV (XVI)

Sleeper Peptide / N-methyl-D-Aspartate (NMDA) Receptor Antagonist

1) J.M. McIntosh, B.M. Olivera, L.J. Cruz, and W.R. Gray, *J. Biol. Chem.*, **259**, 14343 (1984). (*Original*)
2) L.G. Hammerland, B.M. Olivera, and D. Yoshikami, *Eur. J. Pharmacol.*, **226**, 239 (1992). (*Pharmacol.*)
3) Y. Nishiuchi, M. Nakao, M. Nakata, T. Kimura, and S. Sakakibara, *Int. J. Pept. Protein Res.*, **42**, 533 (1993). (*Chem. Synthesis*)

Code	Compound			Price:Yen
4264-v	**Conantokin T**	Vial	0.5 mg	21,000

-20℃

(Marine Snail, *Conus tulipa*)
Gly-Glu-Gla-Gla-Tyr-Gln-Lys-Met-Leu-Gla-Asn-Leu-Arg-Gla-Ala-Glu-Val-Lys-Lys-Asn-Ala-NH_2
(Gla: L-γ-Carboxyglutamic acid)
(M.W. 2683.8) $C_{110}H_{175}N_{31}O_{45}S$
Purity Information : Qx See page IV (XVI)

Sleeper Peptide / N-methyl-D-Aspartate (NMDA) Receptor Antagonist

1) J.A. Haack, J. Rivier, T.N. Parks, E.E. Mena, L.J. Cruz, and B.M. Olivera, *J. Biol. Chem.*, **265**, 6025 (1990). (*Original*)
2) Y. Nishiuchi, M. Nakao, M. Nakata, T. Kimura, and S. Sakakibara, *Int. J. Pept. Protein Res.*, **42**, 533 (1993). (*Chem. Synthesis*)

Conotoxins

1) B.M. Olivera, W.R. Gray, R. Zeikus, J.M. McIntosh, J. Varga, J. Rivier, V. De Santos, and L.J. Cruz, *Science*, **230**, 1338 (1985). (*Review*)
2) W.R. Gray, B.M. Olivera, and L.J. Cruz, *Annu. Rev. Biochem.*, **57**, 665 (1988). (*Review*)
3) R.A. Myers, L.J. Cruz, J.E. Rivier, and B.M. Olivera, *Chem. Rev.*, **93**, 1923 (1993). (*Review*)
4) B.M. Olivera, G.P. Miljanich, J. Ramachandran, and M.E. Adams, *Annu. Rev. Biochem.*, **63**, 823 (1994). (*Review*)

List of Conotoxins

	Code	Compound	Quantity	Price: Yen	Page
α-Conotoxins *(ACh-R Blocker)*					
	4126-v	**α-Conotoxin GI**	0.5 mg vial	20,000	39
	4311-v	**α-Conotoxin ImI**	0.5 mg vial	25,000	39
	4140-v	**α-Conotoxin MI**	0.5 mg vial	20,000	39
	4228-v	**α-Conotoxin SI**	0.5 mg vial	20,000	39
μ-Conotoxins *(Na^+ Channel Blocker)*					
	4217-v	**μ-Conotoxin GIIIB**	0.5 mg vial	38,000	40
	4263-v	**μ-Conotoxin GS**	0.5 mg vial	40,000	40
New	4440-v	**μ-Conotoxin SIIIA**	0.5 mg vial	30,000	40
ω-Conotoxins *(Ca^{2+} Channel Blocker)*					
	4161-v	**ω-Conotoxin GVIA**	0.5 mg vial	38,000	41
	4289-v	**ω-Conotoxin MVIIA**	0.5 mg vial	30,000	41
	4283-s	**ω-Conotoxin MVIIC**	0.1 mg vial	15,000	41
	4283-v	**ω-Conotoxin MVIIC**	0.5 mg vial	30,000	41
	4284-v	**ω-Conotoxin SVIB**	0.5 mg vial	30,000	41

Conotoxins (continued)

Code	Compound			Price:Yen
4126-v -20℃	**α-Conotoxin GI***	Vial	0.5 mg	20,000
	(Marine Snail, *Conus geographus*) (Hydrochloride Form) Glu-Cys-Cys-Asn-Pro-Ala-Cys-Gly-Arg-His-Tyr-Ser-Cys-NH_2 (Disulfide bonds between Cys^2-Cys^7 and Cys^3-Cys^{13}) (M.W. 1437.6) $C_{55}H_{80}N_{20}O_{18}S_4$ [76862-65-2] Purity Information : QE See page IV (XVI) *Blocker for Nicotinic Acetylcholine Receptor* 1) W.R. Gray, A. Luque, B.M. Olivera, J. Barrett, and L.J. Cruz, *J. Biol. Chem.*, **256**, 4734 (1981). (*Original*) 2) Y. Nishiuchi and S. Sakakibara, *FEBS Lett.*, **148**, 260 (1982). (*Chem. Synthesis*)			
4311-v -20℃	**α-Conotoxin ImI**	Vial	0.5 mg	25,000
	(Marine Snail, *Conus imperialis*) Gly-Cys-Cys-Ser-Asp-Pro-Arg-Cys-Ala-Trp-Arg-Cys-NH_2 (Disulfide bonds between Cys^2-Cys^8 and Cys^3-Cys^{12}) (M.W. 1351.6) $C_{52}H_{78}N_{20}O_{15}S_4$ [156467-85-5] *Blocker for Nicotinic Acetylcholine Receptor in Central Nervous System* 1) J.M. McIntosh, D. Yoshikami, E. Mahe, D.B. Nielsen, J.E. Rivier, W.R. Gray, and B.M. Olivera, *J. Biol. Chem.*, **269**, 16733 (1994). (*Original*) 2) D.S. Johnson, J. Martinez, A.B. Elgoyhen, S.F. Heinemann, and J.M. McIntosh, *Mol. Pharmacol.*, **48**,194 (1995). (*Pharmacol.*) 3) E.F.R. Pereira, M. Alkondon, J.M. McIntosh, and E.X. Albuquerque, *J. Pharmacol. Exp. Ther.*, **278**, 1472 (1996). (*Pharmacol.; Competitive Antagonist*)			
4140-v -20℃	**α-Conotoxin MI***	Vial	0.5 mg	20,000
	(Marine Snail, *Conus magus*) Gly-Arg-Cys-Cys-His-Pro-Ala-Cys-Gly-Lys-Asn-Tyr-Ser-Cys-NH_2 (Disulfide bonds between Cys^3-Cys^8 and Cys^4-Cys^{14}) (M.W. 1493.7) $C_{58}H_{88}N_{22}O_{17}S_4$ *Blocker for Nicotinic Acetylcholine Receptor* 1) M. McIntosh, L.J. Cruz, M.W. Hunkapiller, W.R. Gray, and B.M. Olivera, *Arch. Biochem. Biophys.*, **218**, 329 (1982). (*Original*) 2) Y. Nishiuchi and S. Sakakibara, *Peptide Chemistry* 1983, 191 (1984). (*Chem. Synthesis*)			
4228-v -20℃	**α-Conotoxin SI***	Vial	0.5 mg	20,000
	(Marine Snail, *Conus striatus*) Ile-Cys-Cys-Asn-Pro-Ala-Cys-Gly-Pro-Lys-Tyr-Ser-Cys-NH_2 (Disulfide bonds between Cys^2-Cys^7 and Cys^3-Cys^{13}) (M.W. 1353.6) $C_{55}H_{84}N_{16}O_{16}S_4$ *Blocker for Nicotinic Acetylcholine Receptor* 1) G.C. Zafaralla, C. Ramilo, W.R. Gray, R. Karlstrom, B.M. Olivera, and L.J. Cruz, *Biochemistry*, **27**, 7102 (1988). (*Original*)			

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Code	Compound			Price:Yen
4217-v -20℃	**μ-Conotoxin GIIIB***	Vial	0.5 mg	38,000

(Marine Snail, *Conus geographus*)

Arg-Asp-Cys-Cys-Thr-Hyp-Hyp-Arg-Lys-Cys-
Lys-Asp-Arg-Arg-Cys-Lys-Hyp-Met-Lys-Cys-
Cys-Ala-NH_2

(Disulfide bonds between Cys^3-Cys^{15}, Cys^4-Cys^{20}, and Cys^{10}-Cys^{21})

(M.W. 2640.2) $C_{101}H_{175}N_{39}O_{30}S_7$ [140678-12-2]

Na^+ Channel Blocker : Specific for Skeletal Muscle

1) S. Sato, H. Nakamura, Y. Ohizumi, J. Kobayashi, and Y. Hirata, *FEBS Lett.*, **155**, 277 (1983). (*Original*)
2) L.J. Cruz, W.R. Gray, B.M. Olivera, R.D. Zeikus, L. Kerr, D. Yoshikami, and E. Mocyzydlowski, *J. Biol. Chem.*, **260**, 9280 (1985). (*Naming*)
3) Y. Ohizumi, H. Nakamura, J. Kobayashi, and W.A. Catterall, *J. Biol. Chem.*, **261**, 6149 (1986). (*Pharmacol.*)
4) S. Kubo, N. Chino, T.X. Watanabe, T. Kimura, and S. Sakakibara, *Pept. Res.*, **6**, 66 (1993). (*Chem. Synthesis & Pharmacol.*)

4263-v -20℃	**μ-Conotoxin GS**	Vial	0.5 mg	40,000

(Marine Snail, *Conus geographus*)

Ala-Cys-Ser-Gly-Arg-Gly-Ser-Arg-Cys-Hyp-
Hyp-Gln-Cys-Cys-Met-Gly-Leu-Arg-Cys-Gly-
Arg-Gly-Asn-Pro-Gln-Lys-Cys-Ile-Gly-Ala-
His-Gla-Asp-Val

(Gla:L-γ-Carboxyglutamic acid)

(Disulfide bonds between Cys^2-Cys^{14}, Cys^9-Cys^{19}, and Cys^{13}-Cys^{27})

(M.W. 3618.1) $C_{139}H_{226}N_{52}O_{48}S_7$

Purity Information : Qz See page IV (XVI)

Na^+ Channel Blocker

1) Y. Yanagawa, T. Abe, M. Satake, S. Odani, J. Suzuki, and K. Ishikawa, *Biochemistry*, **27**, 6256 (1988). (*Original*)
2) M. Nakao, Y. Nishiuchi, M. Nakata, T. Kimura, and S. Sakakibara, *Lett. Pept. Sci.*, **2**, 17 (1995). (*Chem. Synthesis & S-S Bond*)

4440-v New -20℃	**μ-Conotoxin SIIIA**	Vial	0.5 mg	30,000

(Marine Snail, *Conus striatus*)

Pyr-Asn-Cys-Cys-Asn-Gly-Gly-Cys-Ser-Ser-
Lys-Trp-Cys-Arg-Asp-His-Ala-Arg-Cys-Cys-NH_2

(Reported 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

μ-Conotoxin SIIIA, isolated from *Conus striatus*, is a 20 amino acid residue peptide with three intrachain disulfide bonds[1], the solution structure of which was recently determined by NMR[2]. In contrast to μ-conotoxin GIIIB (Code 4217-v), this peptide is featured to inhibit tetrodotoxin-resistant Na^+ channels in frog sympathetic and dorsal root ganglia, and rat small-diameter dorsal root ganglia neurons at 0.1-10 μM doses[1,3]. Later, in relation to Na^+ channel blocking activity, **μ-conotoxin SIIIA** was found to exhibit analgesic activity in mouse when injected intraperitoneally (10 nmol per mouse)[4].

μ-Conotoxin SIIIA might be a potential research tool for efficient pain modulation.

1) 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.*)
2) S. Yao, M.-M. Zhang, D. Yoshikami, L. Azam, B.M. Olivera, G. Bulaj, and R.S. Norton, *Biochemistry*, **47**, 10940 (2008). (*Solution Structure, S-S Bond, & Pharmacol.*)
3) C.-Z. Wang, H. Zhang, H. Jiang, W. Lu, Z.-Q. Zhao, and C.-W. Chi, *Toxicon*, **47**, 122 (2006). (*Pharmacol.*)
4) 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.*)

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* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Code	Compound			Price:Yen
4161-v -20℃	**ω-Conotoxin GVIA***	Vial	0.5 mg	38,000

(Marine Snail, *Conus geographus*)

Cys-Lys-Ser-Hyp-Gly-Ser-Ser-Cys-Ser-Hyp-
Thr-Ser-Tyr-Asn-Cys-Cys-Arg-Ser-Cys-Asn-
Hyp-Tyr-Thr-Lys-Arg-Cys-Tyr-NH_2

(Disulfide bonds between Cys^{1}-Cys^{16}, Cys^{8}-Cys^{19}, and Cys^{15}-Cys^{26})

(M.W. 3037.3) $C_{120}H_{182}N_{38}O_{43}S_6$ [106375-28-4]

N-type Ca^{2+} Channel Blocker

1) B.M. Olivera, J.M. McIntosh, L.J. Cruz, F.A. Luque, and W.R. Gray, *Biochemistry*, **23**, 5087 (1984). (*Original*)
2) Y. Nishiuchi, K.Y. Kumagaye, Y. Noda, T.X. Watanabe, and S. Sakakibara, *Biopolymers*, **25**, S61 (1986). (*Chem. Synthesis & S-S Bond*)

4289-v -20℃	**ω-Conotoxin MVIIA***	Vial	0.5 mg	30,000

(Marine Snail, *Conus magus*)

Cys-Lys-Gly-Lys-Gly-Ala-Lys-Cys-Ser-Arg-
Leu-Met-Tyr-Asp-Cys-Cys-Thr-Gly-Ser-Cys-
Arg-Ser-Gly-Lys-Cys-NH_2

(Reported disulfide bonds between Cys^{1}-Cys^{16}, Cys^{8}-Cys^{20}, and Cys^{15}-Cys^{25})

(M.W. 2639.1) $C_{102}H_{172}N_{36}O_{32}S_7$ [107452-89-1]

Reversible N-type Ca^{2+} Channel Blocker

1) B.M. Olivera, L.J. Cruz, V. de Santos, G.W. Le Cheminant, D. Griffin, R. Zeikus, J.M. McIntosh, R. Galyean, J. Varga, W.R. Gray, and J. Rivier, *Biochemistry*, **26**, 2086 (1987). (*Original*)
2) K. Valentino, R. Newcomb, T. Gadbois, T. Singh, S. Bowersox, S. Binter, A. Justice, D. Yamashiro, B.B. Hoffman, R. Ciaranello, G. Miljanich, and J. Ramachandran, *Proc. Natl. Acad. Sci. U.S.A.*, **90**, 7894 (1993). (*Pharmacol.*)
3) J.A. Fox, *Pflügers Arch.*, **429**, 873 (1995). (*Pharmacol.*)

4283-s -20℃	**ω-Conotoxin MVIIC**	Vial	0.1 mg	15,000

(Marine Snail, *Conus magus*)

Cys-Lys-Gly-Lys-Gly-Ala-Pro-Cys-Arg-Lys-
Thr-Met-Tyr-Asp-Cys-Cys-Ser-Gly-Ser-Cys-
Gly-Arg-Arg-Gly-Lys-Cys-NH_2

(Disulfide bonds between Cys^{1}-Cys^{16}, Cys^{8}-Cys^{20}, and Cys^{15}-Cys^{26})

(M.W. 2749.3) $C_{106}H_{178}N_{40}O_{32}S_7$ [147794-23-8]

4283-v -20℃	**ω-Conotoxin MVIIC**	Vial	0.5 mg	30,000

(Marine Snail, *Conus magus*)

P/Q-type Ca^{2+} Channel Blocker

1) D.R. Hillyard, V.D. Monje, I.M. Mintz, B.P. Bean, L. Nadasdi, J. Ramachandran, G. Miljanich, A. Azimi-Zoonooz, J.M. McIntosh, L.J. Crutz, J.S. Imperial, and B.M. Olivera, *Neuron*, **9**, 69 (1992). (*Original; cDNA and Pharmacol.*)
2) M.E. Adams, R.A. Myers, J.S. Imperial, and B.M. Olivera, *Biochemistry*, **32**, 12566 (1993). (*Pharmacol.*)
3) W.A. Sather, T. Tanabe, J.-F. Zhang, Y. Mori, M.E. Adams, and R.W. Tsien, *Neuron*, **11**, 291 (1993). (*Pharmacol.*)
4) D.B. Wheeler, A. Randall, and R.W. Tsien, *Science*, **264**, 107 (1994). (*Pharmacol.*)

4284-v -20℃	**ω-Conotoxin SVIB***	Vial	0.5 mg	30,000

(Marine Snail, *Conus striatus*)

Cys-Lys-Leu-Lys-Gly-Gln-Ser-Cys-Arg-Lys-
Thr-Ser-Tyr-Asp-Cys-Cys-Ser-Gly-Ser-Cys-
Gly-Arg-Ser-Gly-Lys-Cys-NH_2

(Reported disulfide bonds between Cys^{1}-Cys^{16}, Cys^{8}-Cys^{20}, and Cys^{15}-Cys^{26})

(M.W. 2739.1) $C_{105}H_{176}N_{38}O_{36}S_6$ [150433-82-2]

N-type Ca^{2+} Channel Blocker

1) C.A. Ramilo, G.C. Zafaralla, L. Nadasdi, L.G. Hammerland, D. Yoshikami, W.R. Gray, R. Kristipati, J. Ramachandran, G. Miljanich, B.M. Olivera, and L.J. Cruz, *Biochemistry*, **31**, 9919 (1992). (*Original*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

List of Ion Channel Blockers

	Code	Compound	Quantity	Price: Yen
Ca^{2+} Channel Blockers				
L-type				
	4255-s	**Calciseptine**	0.1 mg vial	30,000
	4310-s	**Calcicludine**	0.1 mg vial	30,000
N-type				
	4161-v	**ω-Conotoxin GVIA**	0.5 mg vial	38,000
	4289-v	**ω-Conotoxin MVIIA**	0.5 mg vial	30,000
	4284-v	**ω-Conotoxin SVIB**	0.5 mg vial	30,000
P-type				
	4256-s	**ω-Agatoxin IVA**	0.1 mg vial	30,000
	4294-s	**ω-Agatoxin TK (ω-Agatoxin IVB)**	0.1 mg vial	30,000
P/Q-type				
	4283-s	**ω-Conotoxin MVIIC**	0.1 mg vial	15,000
	4283-v	**ω-Conotoxin MVIIC**	0.5 mg vial	30,000
R-type				
	4363-s	**SNX-482**	0.1 mg vial	30,000
T-type				
	4375-s	**Kurtoxin** (also has Na^+ channel blocking activity)	0.1 mg vial	30,000
Others				
	4300-s	**PLTX-II**	0.1 mg vial	30,000
	4247-s	**Agelenin**	0.1 mg vial	30,000
K^+ Channel Blockers				
Ca^{2+}-Activated K^+ Channel Blockers				
BK-type (High conductance)				
	4235-s	**Iberiotoxin**	0.1 mg vial	23,000
	4259-s	**Kaliotoxin (1-37)**	0.1 mg vial	22,000
IK-type (Intermediate conductance)				
	4227-s	**Charybdotoxin** (also has BK-type blocking activity)	0.1 mg vial	22,000
SK-type (Small conductance)				
	4257-v	**Apamin**	0.5 mg vial	18,000
	4260-s	**Scyllatoxin (Leiurotoxin I)**	0.1 mg vial	20,000
Voltage-Dependent K^+ Channel Blockers				
	4258-v	**MCD-Peptide**	0.5 mg vial	25,000
	4287-s	**Stichodactyla Toxin**	0.1 mg vial	22,000
	4290-s	**Margatoxin**	0.1 mg vial	22,000
	4313-s	**Tityustoxin Kα**	0.1 mg vial	30,000
	4330-s	**Dendrotoxin I**	0.1 mg vial	30,000
	4433-s	**Guangxitoxin-1E**	0.1 mg vial	22,000
Inward-Rectifier K^+ Channel Blocker				
	4364-s	**Tertiapin**	0.1 mg vial	15,000
Na^+ Channel Blockers				
	4217-v	**μ-Conotoxin GIIIB**	0.5 mg vial	38,000
	4263-v	**μ-Conotoxin GS**	0.5 mg vial	40,000
New	4440-v	**μ-Conotoxin SIIIA**	0.5 mg vial	30,000
New	4455-s	**Huwentoxin-IV**	0.1 mg vial	22,000
New	4450-s	**ProTx-II**	0.1 mg vial	20,000
Cl^- Channel Blocker				
	4282-v	**Chlorotoxin**	0.5 mg vial	45,000
Other Blockers				
	4393-s	**GsMTx-4**	0.1 mg vial	22,000
	4409-s	**ProTx-I**	0.1 mg vial	22,000
	4435-s	**Psalmotoxin 1**	0.1 mg vial	23,000
New	4457-s	**Purotoxin-1**	0.1 mg vial	22,000

1) C.L. Rivier and P.M. Plotsky, *Annu. Rev. Physiol.*, **48**, 475 (1986). (*Review*)
2) F.A. Antoni, *Endocrinol. Rev.*, **7**, 351 (1986). (*Review*)
3) M.J. Owens and C.B. Nemeroff, *Pharmacol. Rev.*, **43**, 425 (1991). (*Review*)
4) M. Schaefer, S.A. Mousa, and C. Stein, *Eur. J. Pharmacol.*, **323**, 1 (1997). (*Review*)

Code	Compound			Price:Yen
4136-s -20℃	**CRF (Human, Rat)** **Corticotropin Releasing Factor (Human, Rat)** **CRH / Corticotropin Releasing Hormone (Human, Rat)** Ser-Glu-Glu-Pro-Pro-Ile-Ser-Leu-Asp-Leu-Thr-Phe-His-Leu-Leu-Arg-Glu-Val-Leu-Glu-Met-Ala-Arg-Ala-Glu-Gln-Leu-Ala-Gln-Gln-Ala-His-Ser-Asn-Arg-Lys-Leu-Met-Glu-Ile-Ile-NH_2 (M.W. 4757.5) $C_{208}H_{344}N_{60}O_{63}S_2$ [86784-80-7]	Vial	0.1 mg	12,000
4136-v -20℃	**CRF (Human, Rat)** **Corticotropin Releasing Factor (Human, Rat)** **CRH / Corticotropin Releasing Hormone (Human, Rat)** 1) J. Spiess, J. Rivier, and W. Vale, *Biochemistry*, **22**, 4341 (1983). (*Original; Rat*) 2) S. Shibahara, Y. Morimoto, Y. Furutani, M. Notake, H. Takahashi, S. Shimizu, S. Horikawa, and S. Numa, *EMBO J.*, **2**, 775 (1983). (*Original; Human*) • This compound is distributed through Peptide Institute, Inc. under the license of The Salk Institute.	Vial	0.5 mg	41,000
4111-s -20℃	**CRF (Ovine)** **Corticotropin Releasing Factor (Ovine)** **CRH / Corticotropin Releasing Hormone (Ovine)** Ser-Gln-Glu-Pro-Pro-Ile-Ser-Leu-Asp-Leu-Thr-Phe-His-Leu-Leu-Arg-Glu-Val-Leu-Glu-Met-Thr-Lys-Ala-Asp-Gln-Leu-Ala-Gln-Gln-Ala-His-Ser-Asn-Arg-Lys-Leu-Leu-Asp-Ile-Ala-NH_2 (M.W. 4670.3) $C_{205}H_{339}N_{59}O_{63}S$ [79804-71-0]	Vial	0.1 mg	12,000
4111-v -20℃	**CRF (Ovine)** **Corticotropin Releasing Factor (Ovine)** **CRH / Corticotropin Releasing Hormone (Ovine)** 1) W. Vale, J. Spiess, C. Rivier, and J. Rivier, *Science*, **213**, 1394 (1981). (*Original*) • This compound is distributed through Peptide Institute, Inc. under the license of The Salk Institute.	Vial	0.5 mg	41,000
4141-s -20℃	**Tyrosyl-CRF (Human, Rat)** **Tyrosyl-Corticotropin Releasing Factor (Human, Rat)** **Tyrosyl-CRH / Tyrosyl-Corticotropin Releasing Hormone (Human, Rat)** Tyr-Ser-Glu-Glu-Pro-Pro-Ile-Ser-Leu-Asp-Leu-Thr-Phe-His-Leu-Leu-Arg-Glu-Val-Leu-Glu-Met-Ala-Arg-Ala-Glu-Gln-Leu-Ala-Gln-Gln-Ala-His-Ser-Asn-Arg-Lys-Leu-Met-Glu-Ile-Ile-NH_2 (M.W. 4920.6) $C_{217}H_{353}N_{61}O_{65}S_2$ [100513-58-4] Purity Information : Qx See page IV (XVI) *For Radioimmunoassay* 1) P.C. Wynn, G. Aguilera, J. Morell, and K.J. Catt, *Biochem. Biophys. Res. Commun.*, **110**, 602 (1983). (*Biochem.*) • This compound is distributed through Peptide Institute, Inc. under the license of The Salk Institute.	Vial	0.1 mg	14,000

Cortistatin

Code	Compound			Price:Yen
4329-v -20℃	**Cortistatin (Rat)** **CST-14 (Rat)** Pro-Cys-Lys-Asn-Phe-Phe-Trp-Lys-Thr-Phe-Ser-Ser-Cys-Lys (Disulfide bond between Cys^{2}-Cys^{13}) (M.W. 1721.0) $C_{81}H_{113}N_{19}O_{19}S_2$ *Neuronal Depressant and Sleep-Modulating Peptide*	Vial	0.5 mg	15,000

1) L. de Lecea, J.R. Criado, O. Prospero-Garcia, K.M. Gautvik, P. Schweitzer, P.E. Danielson, C.L.M. Dunlop, G.R. Siggins, S.J. Henriksen, and J.G. Sutcliffe, *Nature*, **381**, 242 (1996). (*Original*)
2) L. de Lecea, J.A. del Rio, J.R. Criado, S. Alcantara, M. Morales, P.E. Danielson, S.J. Henriksen, E. Soriano, and J.G. Sutcliffe, *J. Neurosci.*, **17**, 5868 (1997). (*Biochem.*)
3) M. Connor, S.L. Ingram, and M.J. Christie, *Br. J. Pharmacol.*, **122**, 1567 (1997). (*Pharmacol.*)
4) A.D. Spier and L. de Lecea, *Brain Res. Rev.*, **33**, 228 (2000). (*Review*)

C-type Natriuretic Peptides (CNP)

1) A. Rosenzweig and C.E. Seidman, *Annu. Rev. Biochem.*, **60**, 229 (1991). (*Review*)

Code	Compound			Price:Yen
4229-v -20℃	**CNP-22 (Human)*** **C-type Natriuretic Peptide-22 (Human) (Porcine, Rat, Mouse)** Gly-Leu-Ser-Lys-Gly-Cys-Phe-Gly-Leu-Lys-Leu-Asp-Arg-Ile-Gly-Ser-Met-Ser-Gly-Leu-Gly-Cys (Disulfide bond between Cys^{6}-Cys^{22}) (M.W. 2197.6) $C_{93}H_{157}N_{27}O_{28}S_3$ [127869-51-6]	Vial	0.5 mg	36,000

1) T. Sudoh, N. Minamino, K. Kangawa, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **168**, 863 (1990). (*Original; Porcine*)
2) Y. Tawaragi, K. Fuchimura, S. Tanaka, N. Minamino, K. Kangawa, H. Matsuo, *Biochem. Biophys. Res. Commun.*, **175**, 645 (1991). (*cDNA Seq.; Human*)
3) M. Kojima, N. Minamino, K. Kangawa, and H. Matsuo, *FEBS Lett.*, **276**, 209 (1990). (*cDNA Seq.; Rat*)
4) Y. Ogawa, H. Itoh, Y. Yoshitake, M. Inoue, T. Yoshimasa, T. Serikawa, K. Nakao, *Genomics*, **24**, 383 (1994). (*Nucleotide Seq.; Mouse*)

Code	Compound			Price:Yen
4241-s -20℃	**CNP-53 (Human)*** **C-type Natriuretic Peptide-53 (Human)** Asp-Leu-Arg-Val-Asp-Thr-Lys-Ser-Arg-Ala-Ala-Trp-Ala-Arg-Leu-Leu-Gln-Glu-His-Pro-Asn-Ala-Arg-Lys-Tyr-Lys-Gly-Ala-Asn-Lys-Lys-Gly-Leu-Ser-Lys-Gly-Cys-Phe-Gly-Leu-Lys-Leu-Asp-Arg-Ile-Gly-Ser-Met-Ser-Gly-Leu-Gly-Cys (Disulfide bond between Cys^{37}-Cys^{53}) (M.W. 5801.7) $C_{251}H_{417}N_{81}O_{71}S_3$ [141294-77-1]	Vial	0.1 mg	28,000

1) Y. Tawaragi, K. Fuchimura, S. Tanaka, N. Minamino, K. Kangawa, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **175**, 645 (1991). (*Original*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

C-type Natriuretic Peptides (CNP) (continued)

Code	Compound			Price:Yen
4240-s -20℃	**CNP-53 (Porcine, Rat)***	Vial	0.1 mg	28,000

C-type Natriuretic Peptide-53 (Porcine, Rat)
Asp-Leu-Arg-Val-Asp-Thr-Lys-Ser-Arg-Ala-Ala-Trp-Ala-Arg-Leu-Leu-His-Glu-His-Pro-Asn-Ala-Arg-Lys-Tyr-Lys-Gly-Gly-Asn-Lys-Lys-Gly-Leu-Ser-Lys-Gly-Cys-Phe-Gly-Leu-Lys-Leu-Asp-Arg-Ile-Gly-Ser-Met-Ser-Gly-Leu-Gly-Cys
(Disulfide bond between Cys^{37}-Cys^{53})
(M.W. 5796.7) $C_{251}H_{414}N_{82}O_{70}S_3$

1) N. Minamino, K. Kangawa, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **170**, 973 (1990). (*Original; Porcine*)
2) Y. Tawaragi, K. Fuchimura, H. Nakazato, S. Tanaka, N. Minamino, K. Kangawa, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **172**, 627 (1990). (*Original; Porcine Nucleotide Seq.*)
3) M. Kojima, N. Minamino, K. Kangawa, and H. Matsuo, *FEBS Lett.*, **276**, 209 (1990). (*Original; Rat cDNA*)

4251-v -20℃	**Tyrosyl-CNP-22 (Human)***	Vial	0.5 mg	43,000

Tyrosyl-C-type Natriuretic Peptide-22 (Human)
Tyr-Gly-Leu-Ser-Lys-Gly-Cys-Phe-Gly-Leu-Lys-Leu-Asp-Arg-Ile-Gly-Ser-Met-Ser-Gly-Leu-Gly-Cys
(Disulfide bond between Cys^{6}-Cys^{22})
(M.W. 2360.8) $C_{102}H_{166}N_{28}O_{30}S_3$ [142878-79-3]

For Radioimmunoassay

1) J. Brown and Z. Zuo, *Am. J. Physiol.*, **266**, R1383 (1994). (*Pharmacol.*)
2) J. Zhao, N. Ardaillou, C.-Y. Lu, S. Placier, P. Pham, L. Badre, J. Cambar, and R. Ardaillou, *Kidney Int.*, **46**, 717 (1994). (*Pharmacol.*)

***cyclo* (Arg-Gly-Asp-D-Phe-Val)** See Code 4304 on page 23

Decorsin See Code 4269 on page 23

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Defensins

1) R.I. Lehrer and T. Ganz, *Ann. N. Y. Acad. Sci.*, **797**, 228 (1996). (*Review*)
2) M. Zasloff, *Nature*, **415**, 389 (2002). (*Review*)
3) T. Hirsch, F. Jacobsen, H.-U. Steinau, and L. Steinstraesser, *Protein Pept. Lett.*, **15**, 238 (2008). (*Review*)
4) M. Pazgier, X. Li, W. Lu, and J. Lubkowski, *Curr. Pharm. Des.*, **13**, 3096 (2007). (*Review*)
5) Y.P. Lai and R.L. Gallo, *Trends Immunol.*, **30**,131 (2009). (*Review*)

List of Defensins

	Code	Compound	Quantity	Price: Yen	Page
	4271-s	**α-Defensin-1 (Human)** HNP–1	0.1 mg vial	20,000	46
	4428-s	**α-Defensin-2 (Human)** HNP–2	0.1 mg vial	20,000	46
	4416-s	**α-Defensin-3 (Human)** HNP–3	0.1 mg vial	20,000	47
New	4431-s	**α-Defensin-4 (Human)** HNP-4	0.1 mg vial	22,000	48
	4415-s	**α-Defensin-5 (Human)** HD–5	0.1 mg vial	22,000	49
New	4458-s	**α-Defensin-6 (Human)** HD-6	0.1 mg vial	22,000	50
	4337-s	**β-Defensin-1 (Human)** hBD–1	0.1 mg vial	22,000	51
	4338-s	**β-Defensin-2 (Human)** hBD–2	0.1 mg vial	23,000	51
	4382-s	**β-Defensin-3 (Human)** hBD–3	0.1 mg vial	24,000	52
	4406-s	**β-Defensin-4 (Human)** hBD–4	0.1 mg vial	22,000	53

Defensins (continued)

Code	Compound			Price:Yen
4271-s -20℃	**α-Defensin-1 (Human)** **HNP-1** (Human Neutrophil Peptide-1) Ala-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 bonds between Cys^2-Cys^{30}, Cys^4-Cys^{19}, and Cys^9-Cys^{29}) (M.W. 3442.0) $C_{150}H_{222}N_{44}O_{38}S_6$ *Antimicrobial Peptide / Chemoattractant for Monocytes*	Vial	0.1 mg	20,000

1) T. Ganz, M.E. Selsted, D. Szklarek, S.S.L. Harwig, K. Daher, D.F. Bainton, and R.I. Lehrer, *J. Clin. Invest.*, **76**, 1427 (1985). (*Original; Isolation*)
2) M.E. Selsted, S.S.L. Harwig, T. Ganz, J.W. Schilling, and R.I. Lehrer, *J. Clin. Invest.*, **76**, 1436 (1985). (*Original; Structure*)
3) S. Kubo, K. Tanimura, H. Nishio, N. Chino, T. Teshima, T. Kimura, and Y. Nishiuchi, *Int. J. Pept. Res. Ther.*, **14**, 341 (2008). (*Chem. Synthesis & Pharmacol.*)

Code	Compound			Price:Yen
4428-s -20℃	**α-Defensin-2 (Human)** **HNP-2** (Human Neutrophil Peptide-2) 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 bonds 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*	Vial	0.1 mg	20,000

Human α-defensins are composed of 6 peptides: 4 human neutrophil peptides [HNP-1 (Code 4271-s), HNP-2, HNP-3 (Code 4416-s), and HNP-4 (Code 4431-s)] and 2 human defensins [HD-5 (Code 4415-s) and HD-6 (Code 4458-s)]. Among them, the primary structures of HNP-1, HNP-2 and HNP-3 differ only at the amino-terminal residue, in which the first residue is Ala for HNP-1 and Asp for HNP-3, whereas HNP-2 lacks this position, resulting in the 29-residue peptide[1,2]. Recent studies by mass spectroscopic analysis clarified that HNP-2 is the second major component in squamous cell carcinoma of human tongue[3] and gingival crevicular fluid from periodontitis patients and healthy controls[4], where HNP-1 is the most abundant and HNP-3 is the least. Taking this fact into account, it is speculated that HNP-2 is produced post-translationally from HNP-3. Concerning the activity, HNP-2 is revealed to be as active as HNP-1 in neutralizing anthrax lethal toxin[5] and blocking papillomavirus infection[6], although some differences were pointed out in the candidacidal activity among HNPs[7].

1) T. Ganz, M.E. Selsted, D. Szklarek, S.S.L. Harwig, K. Daher, D.F. Bainton, and R.I. Lehrer, *J. Clin. Invest.*, **76**, 1427 (1985). (*Original; Isolation*)
2) M.E. Selsted, S.S.L. Harwig, T. Ganz, J.W. Schilling, and R.I. Lehrer, *J. Clin. Invest.*, **76**, 1436 (1985). (*Original; Structure*)
3) F.T. Lundy, D.F. Orr, J.R. Gallagher, P. Maxwell, C. Shaw, S.S. Napier, C.G. Cowan, P.-J. Lamey, and J.J. Marley, *Oral Oncol.*, **40**, 139 (2004). (*Pharmacol.; HNP in Squamous Cell Carcinoma*)
4) F.T. Lundy, D.F. Orr, C. Shaw, P.-J. Lamey, and G.J. Linden, *Mol. Immunol.*, **42**, 575 (2005). (*Pharmacol.; HNP in Gingival Crevicular Fluid*)
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). (*Pharmacol.; Neutralization of Anthrax Lethal Toxin*)
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). (*Pharmacol.; Inhibition of Papillomavirus Infection*)
7) R.I. Lehrer, T. Ganz, D. Szklarek, and M.E. Selsted, *J. Clin. Invest.*, **81**, 1829 (1988). (*Pharmacol.; Activity difference in HNP*)
8) S. Kubo, K. Tanimura, H. Nishio, N. Chino, T. Teshima, T. Kimura, and Y. Nishiuchi, *Int. J. Pept. Res. Ther.*, **14**, 341 (2008). (*Chem. Synthesis & Pharmacol.*)

Code	Compound			Price:Yen
4416-s -20℃	**α-Defensin-3 (Human)** **HNP-3** (Human Neutrophil Peptide-3) Asp-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 bonds between Cys^2-Cys^{30}, Cys^4-Cys^{19}, and Cys^9-Cys^{29}) (M.W. 3486.0) $C_{151}H_{222}N_{44}O_{40}S_6$	Vial	0.1 mg	20,000

Antimicrobial Peptide

HNP-1 to HNP-3 are the major components in azophilic granules of human neutrophils[1, 2]. The primary structures of HNP-1 to HNP-3 differ by only one amino acid residue at position 1; HNP-2 corresponds to positions 2 through 30 of HNP-1 (des-Ala^1-HNP-1) while **HNP-3** is Asp^1-HNP-1. Interesting publications using HNP include: **i)** HNP-1 to HNP-3 may show anti-HIV-1 activity[3], and **ii)** HNP-1 to HNP-3 are overexpressed in squamous cell carcinomas of the human tongue, representing a possible role in innate host defense against tumor invasion[4]. It has been reported that expression of HNP-1 to HNP-3 is not upregulated by lipopolysaccharide[5], while they locate in intestinal epithelial cells in cases of inflammatory bowel disease[6].

1) T. Ganz, M.E. Selsted, D. Szklarek, S.S.L. Harwig, K. Daher, D.F. Bainton, and R.I. Lehrer, *J. Clin. Invest.*, **76**, 1427 (1985). (*Original; Isolation of HNP 1-3*)
2) M.E. Selsted, S.S.L. Harwig, T. Ganz, J.W. Schilling, and R.I. Lehrer, *J. Clin. Invest.*, **76**, 1436 (1985). (*Original; Structure of HNP 1-3*)
3) C.E. Mackewicz, J. Yuan, P. Tran, L. Diaz, E. Mack, M.E. Selsted, and J.A. Levy, *AIDS*, **17**, F23 (2003). (*Pharmacol.; Anti–HIV–1 Activity*)
4) F.T. Lundy, D.F. Orr, J.R. Gallagher, P. Maxwell, C. Shaw, S.S. Napier, C.G. Cowan, P.-J. Lamey, and J.J. Marley, *Oral Oncol.*, **40**, 139 (2004). (*Pharmacol.; Role in Tumor Invasion*)
5) X.-M. Fang, Q. Shu, Q.-X. Chen, M. Book, H.-G. Sahl, A. Hoeft, and F. Stuber, *Eur. J. Clin. Invest.*, **33**, 82 (2003). (*Histochem.; Regulation of Expression*)
6) R.N. Cunliffe, *Mol. Immunol.*, **40**, 463 (2003). (*Histochem.; α-Defensin in Gastrointestinal Tract*)
7) S. Kubo, K. Tanimura, H. Nishio, N. Chino, T. Teshima, T. Kimura, and Y. Nishiuchi, *Int. J. Pept. Res. Ther.*, **14**, 341 (2008). (*Chem. Synthesis & Pharmacol.*)

Code	Compound			Price:Yen
4431-s New -20℃	**α-Defensin-4 (Human)** **HNP-4** (Human Neutrophil Peptide-4) 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. 3709.4) $C_{157}H_{255}N_{49}O_{43}S_6$ *Antimicrobial Peptide*	Vial	0.1 mg	22,000

Four α-defensins in neutrophils are called human neutrophil peptide-1 (HNP-1) to HNP-4, in which primary structures of HNP-1 to HNP-3 are similar; Ala and Asp are the first residue of HNP-1 (Code 4271) and HNP-3 (Code 4416), respectively, whereas HNP-2 (Code 4428) lacks the corresponding amino acid residue at position 1. In contrast to these HNPs, **α-defensin-4** (**HNP-4**) shows marked difference in its primary structure although all six Cys residues are conserved[1,2].

Activities of **HNP-4** reported so far include: **i)** inhibition of the ACTH action in rat adrenal cell suspension (ID_{50} = 7.0 X 10^{-7} M)[1], **ii)** distinct antimicrobial activity[3,4], **iii)** antiviral activity against X4 and R5 HIV-1 strains[5], and **iv)** inhibition of *Bacillus anthracis* lethal factor (IC_{50} = 811 nM)[6]. In the HIV-1 inhibition, it is proposed that **HNP-4** exerts the activity by the lectin-independent property with CD4 and/or gp120, which is different from that of HNP-1 to HNP-3[5].

Although the research using **HNP-4** seems to be relatively slowly proceeding at moment, partly because **HNP-4** is a minor component in the granulocytes HNPs, our synthetic **HNP-4** will contribute significantly to clarify the total activity of HNPs in the body.

1) 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*)
2) 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*)
3) Z. Wu, B. Ericksen, K. Tucker, J. Lubkowski, and W. Lu, *J. Pept. Res.*, **64**, 118 (2004). (*Pharmacol; Antimicrobial Activity*)
4) B. Ericksen, Z. Wu, W. Lu, and R.I. Lehrer, *Antimicrob. Agents Chemother.*, **49**, 269 (2005). (*Pharmacol; Antimicrobial Activity*)
5) Z. Wu, F. Cocchi, D. Gentles, B. Ericksen, J. Lubkowski, A. DeVico, R.I. Lehrer, and W. Lu, *FEBS Lett.*, **579**, 162 (2005). (*Pharmacol.; HIV-1 Inhibitory Activity*)
6) G. Wei, E. de Leeuw, M. Pazgier, W. Yuan, G. Zou, J. Wang, B. Ericksen, W.-Y. Lu, R.I. Lehrer, and W. Lu, *J. Biol. Chem.*, **284**, 29180 (2009). (*Pharmacol.;Iinhibition of Bacillus anthracis Lethal Factor*)

Code	Compound			Price:Yen
4415-s -20℃	**α-Defensin-5 (Human)** **HD-5** (Human Defensin-5) Ala-Thr-Cys-Tyr-Cys-Arg-Thr-Gly-Arg-Cys- Ala-Thr-Arg-Glu-Ser-Leu-Ser-Gly-Val-Cys- Glu-Ile-Ser-Gly-Arg-Leu-Tyr-Arg-Leu-Cys- Cys-Arg (Disulfide bonds between Cys^3-Cys^{31}, Cys^5-Cys^{20}, and Cys^{10}-Cys^{30}) (M.W. 3582.1) $C_{144}H_{238}N_{50}O_{45}S_6$	Vial	0.1 mg	22,000

Antimicrobial Peptide in Paneth Cells

HD-5 is expressed in Paneth cells in intestinal epithelium, thus, falls into a distinct subclass of human α-defensin[1, 2]. The *in vivo* role of **HD-5** was studied in transgenic mouse models injected by an **HD-5** minigene, confirming that **HD-5** expression was specific to Paneth cells and resulted in resistance to bacterial challenge[3]. In patients with HIV-related cryptosporidiosis, **HD-5** immunoreactivity was reduced in association with Paneth cell granule depletion[4]. In inflammatory bowel disease, **HD-5** was expressed in metaplastic Paneth cells in the colon[5]. These evidences together point to **HD-5** as being an essential factor in the defense against intestinal inflammation.

1) D.E. Jones and C.L. Bevins, *J. Biol. Chem.*, **267**, 23216 (1992). (*Original; Human Defensin-5*)
2) E.M. Porter, M.A. Poles, J.S. Lee, J. Naitoh, C.L. Bevins, amd T. Ganz, *FEBS Lett.*, **434**, 272 (1998). (*Pharmacol.; Endogenous Form*)
3) N.H. Salzman, D. Ghosh, K.M. Huttner, Y. Paterson, and C.L. Bevins, *Nature*, **422**, 522 (2003). (*Pharmacol.*)
4) P. Kelly, R. Feakins, P. Domizio, J. Murphy, C. Bevins, J. Wilson, G. Mcphail, R. Poulsom, and W. Dhaliwal, *Clin. Exp. Immunol.*, **135**, 303 (2004). (*Histochem.; Location in AIDS Patients*)
5) R.N. Cunliffe, *Mol. Immunol.*, **40**, 463 (2003). (*Histochem.; α-Defensin in Gastrointestinal Tract*)
6) S. Kubo, K. Tanimura, H. Nishio, N. Chino, T. Teshima, T. Kimura, and Y. Nishiuchi, *Int. J. Pept. Res. Ther.*, **14**, 341 (2008). (*Chem. Synthesis & Pharmacol.*)

Code	Compound			Price:Yen
4458-s New -20℃	**α-Defensin-6 (Human)** **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. 3708.2) $C_{156}H_{228}N_{46}O_{46}S_7$ *Antimicrobial Peptide in Paneth Cells*	Vial	0.1 mg	22,000

Six α-defensins have been identified in the human; four of which are found in neutrophiles and thus named human neutrophil peptide-1 (HNP-1, Code 4271-s), HNP-2 (Code 4428-s), HNP-3 (Code 4416-s) and HNP-4 (Code 4431-s). The remaining two are called human defensin-5 (HD-5, Code 4415-s) and **human defensin-6** (**HD-6**)[1], which are identified in intestinal Paneth cells.

HD-6 was isolated from ileal neobladder urine as a 32-residue peptide[2]. It appeared in the initial study that **HD-6** was practically inactive against some bacteria and fungi[3]. However, the experimental results proving **HD-6** to be an antimicrobial peptide have been accumulating: **i)** *Helicobacter pylori* infection increases **HD-6** expression in the fundus[4], **ii)** **HD-6** inhibits herpes simplex virus infection[5], **iii)** **HD-6** has influenza A virus neutralizing ability[6], and **iv)** the **HD-6** level is reduced in small intestinal Crohn's disease[7]. In contrast to these positive effects in the host defense system, *Neisseria gonorrhoeae*-induced **HD-6** enhances HIV infectivity, showing how complex **HD-6** activity may be[8].

Anyhow, these specific characteristics observed in **HD-6** are attractive in the study of human innate immunity.

1) D.E. Jones and C.L. Bevins, *FEBS Lett.*, **315**, 187 (1993). (*Original; mRNA Seq.*)
2) E.M. Porter, M.A. Poles, J.S. Lee, J. Naitoh, C.L. Bevins, and T. Ganz, *FEBS Lett.*, **434**, 272 (1998). (*Endogenous Form*)
3) B. Ericksen, Z. Wu, W. Lu, and R.I. Lehrer, *Antimicrob. Agents Chemother.*, **49**, 269 (2005). (*Pharmacol.; No Antibacterial Activity*)
4) J. Wehkamp, K. Schmidt, K.R. Herrlinger, S. Baxmann, S. Behling, C. Wohlschläger, A.C. Feller, E.F. Stange, and K. Fellermann, *J. Clin. Pathol.*, **56**, 352 (2003). (*Pharmacol.; Enhanced Expression in Helicobacter pylori Infection*)
5) 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*)
6) 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*)
7) M.J. Koslowski, J. Beisner, E.F. Stange, and J. Wehkamp, *Int. J. Med. Microbiol.*, **300**, 34 (2010). (*Minireview; Antimicrobial Host Defense in Small Intestinal Crohn's Disease*)
8) 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*)

Defensins (continued)

Code	Compound			Price:Yen
4337-s -20℃	**β-Defensin-1 (Human)** **hBD-1** Asp-His-Tyr-Asn-Cys-Val-Ser-Ser-Gly-Gly-Gln-Cys-Leu-Tyr-Ser-Ala-Cys-Pro-Ile-Phe-Thr-Lys-Ile-Gln-Gly-Thr-Cys-Tyr-Arg-Gly-Lys-Ala-Lys-Cys-Cys-Lys (Disulfide bonds between Cys^{5}-Cys^{34}, Cys^{12}-Cys^{27}, and Cys^{17}-Cys^{35}) (M.W. 3928.5) $C_{167}H_{256}N_{48}O_{50}S_6$	Vial	0.1 mg	22,000

Antimicrobial Peptide

1) K.W. Bensch, M. Raida, H.-J. Mägert, P. Schulz-Knappe, and W.-G. Forssmann, *FEBS Lett.*, **368**, 331 (1995). (*Original*)
2) M.J. Goldman, G.M. Anderson, E.D. Stolzenberg, U.P. Kari, M. Zasloff, and J.M. Wilson, *Cell*, **88**, 553 (1997). (*Pharmacol.; Inactivated in Cystic Fibrosis*)
3) T. Hiratsuka, M. Nakazato, T. Ihi, T. Minematsu, N. Chino, T. Nakanishi, A. Shimizu, K. Kangawa, and S. Matsukura, *Nephron*, **85**, 34 (2000). (*Pharmacol.*)
4) N. Chino, S. Kubo, H. Nishio, Y. Nishiuchi, M. Nakazato, and T. Kimura, *Int. J. Pept. Res. Ther.*, **12**, 203 (2006). (*Chem. Synthesis & Pharmacol.*)

Code	Compound			Price:Yen
4338-s -20℃	**β-Defensin-2 (Human)** **hBD-2** Gly-Ile-Gly-Asp-Pro-Val-Thr-Cys-Leu-Lys-Ser-Gly-Ala-Ile-Cys-His-Pro-Val-Phe-Cys-Pro-Arg-Arg-Tyr-Lys-Gln-Ile-Gly-Thr-Cys-Gly-Leu-Pro-Gly-Thr-Lys-Cys-Cys-Lys-Lys-Pro (Disulfide bonds between Cys^{8}-Cys^{37}, Cys^{15}-Cys^{30}, and Cys^{20}-Cys^{38}) (M.W. 4328.2) $C_{188}H_{305}N_{55}O_{50}S_6$	Vial	0.1 mg	23,000

Antimicrobial Peptide Specific for Gram-Negative Bacteria / Also Effective for Candida albicans

1) J. Harder, J. Bartels, E. Christophers, and J.-M. Schröder, *Nature*, **387**, 861 (1997). (*Original*)
2) T. Hiratsuka, M. Nakazato, Y. Date, J. Ashitani, T. Minematsu, N. Chino, and S. Matsukura, *Biochem. Biophys. Res. Commun.*, **249**, 943 (1998). (*Pharmacol.*)
3) D.M. Hoover, K.R. Rajashankar, R. Blumenthal, A. Puri, J.J. Oppenheim, O. Chertov, and J. Lubkowski, *J. Biol. Chem.*, **275**, 32911 (2000). (*S-S Bond*)
4) T. Hiratsuka, H. Mukae, H. Iiboshi, J. Ashitani, K. Nabeshima, T. Minematsu, N. Chino, T. Ihi, S. Kohno, and M. Nakazato, *Thorax*, **58**, 425 (2003). (*Pharmacol.; Activity against Pseudomonas aeruginosa*)
5) S. Yanagi, J.-i. Ashitani, H. Ishimoto, Y. Date, H. Mukae, N. Chino, and M. Nakazato, *Respiratory Res.*, **6**, 130 (2005). (*Pharmacol. & Immunohistochem.*)
6) N. Chino, S. Kubo, H. Nishio, Y. Nishiuchi, M. Nakazato, and T. Kimura, *Int. J. Pept. Res. Ther.*, **12**, 203 (2006). (*Chem. Synthesis & Pharmacol.*)

Code	Compound			Price:Yen
4382-s −20℃	**β-Defensin-3 (Human)** **hBD-3** Gly-Ile-Ile-Asn-Thr-Leu-Gln-Lys-Tyr-Tyr- Cys-Arg-Val-Arg-Gly-Gly-Arg-Cys-Ala-Val- Leu-Ser-Cys-Leu-Pro-Lys-Glu-Glu-Gln-Ile- Gly-Lys-Cys-Ser-Thr-Arg-Gly-Arg-Lys-Cys- Cys-Arg-Arg-Lys-Lys (Disulfide bonds between Cys^{11}-Cys^{40}, Cys^{18}-Cys^{33}, and Cys^{23}-Cys^{41}) (M.W. 5155.1) $C_{216}H_{371}N_{75}O_{59}S_6$ *Antimicrobial Peptide / Staphylococcus aureus-Killing Factor*	Vial	0.1 mg	24,000

The human defensins represent an important family of antimicrobial peptides. They are composed of two subclasses: α-defensins and β-defensins (hBD), which are characterized by their distinct arrangement of three disulfide bonds. Following the discovery of hBD-1 (Code 4337-s) and hBD-2 (Code 4338-s) in 1995 and 1997, respectively, **hBD-3** was included in 2001[1].

hBD-3 was identified in lesional psoriatic scales, from which hBD-2 was also isolated. Peptide and DNA chemistry revealed **hBD-3** to be a 45 amino acid residue peptide. The antimicrobial activity of **hBD-3** is characterized by: **i)** a broad spectrum of antimicrobial activity against many pathogenic microbes such as multi-resistant *Staphylococcus aureus* and vancomycin-resistant *Enterococcus faecium* without hemolytic activity, **ii)** salt-insensitivity up to 200 mM NaCl, **iii)** expression of activity through cell wall perforation, and **iv)** regulation by TNF-α and contact with bacteria[1]. Later, although the data was obtained using the amino-terminally truncated peptide, **hBD-3** (6-45), the following interesting findings were reported: **i)** **hBD-3** is stimulated by interferon-γ, and **ii)** **hBD-3** has monocyte activating function and elicits ion channel activity[2]. It is also reported that unlike hBD-1 and hBD-2, **hBD-3** mRNA expression is inhibited by corticosteroids[3]. Significant amounts of these peptides are distributed in the following tissues: skin, tonsil, trachea, placenta, testis, thymus, and heart [1,2,4]. With respect to the structural aspects of **hBD-3**, an amphipathic dimeric structure was proposed in solution, which is different from those of hBD-1 and hBD-2. This might be responsible for the bactericidal activity against *Staphylococcus aureus*[5].

Thus, the **hBD-3**, as well as the other defensins, are useful tools for understanding their defense mechanisms against various microorganisms.

1) J. Harder, J. Bartels, E. Christophers, and J.-M. Schröder, *J. Biol. Chem.*, **276**, 5707 (2001). (*Original*)
2) J.-R.C. García, F. Jaumann, S. Schulz, A. Krause, J. Rodrínguez-Jiménez, U. Forssmann, K. Adermann, E. Klüver, C. Vogelmeier, D. Becker, R. Hedrich, W.-G. Forssmann, and R. Bals, *Cell Tissue Res.*, **306**, 257 (2001). (*Original*; *Amino-Terminally Truncated Peptide*)
3) L.A. Duits, M. Rademaker, B. Ravensbergen, M.A.J.A. van Sterkenburg, E. van Strijen, P.S. Hiemstra, and P.H. Nibbering, *Biochem. Biophys. Res. Commun.*, **280**, 522 (2001). (*Pharmacol.*)
4) H.P. Jia, B.C. Schutte, A. Schudy, R. Linzmeier, J.M. Guthmiller, G.K. Johnson, B.F. Tack, J.P. Mitros, A. Rosenthal, T. Ganz, and P.B. McCray, Jr., *Gene*, **263**, 211 (2001). (*DNA Seq. / Tissue Distribution*)
5) D.J. Schibli, H.N. Hunter, V. Aseyev, T.D. Starner, J.M. Wiencek, P.B. McCray, Jr., B.F. Tack, and H.J. Vogel, *J. Biol. Chem.*, **277**, 8279 (2002). (*Solution Structure*)
6) S. Yanagi, J.-i. Ashitani, H. Ishimoto, Y. Date, H. Mukae, N. Chino, and M. Nakazato, *Respiratory Res.*, **6**, 130 (2005). (*Pharmacol. & Immunohistochem.*)
7) N. Chino, S. Kubo, H. Nishio, Y. Nishiuchi, M. Nakazato, and T. Kimura, *Int. J. Pept. Res. Ther.*, **12**, 203 (2006). (*Chem. Synthesis & Pharmacol.*)

Code	Compound			Price:Yen
4406-s -20℃	**β-Defensin-4 (Human)** **hBD-4** **Prepro-hBD-4 (Human, 25-61)** Glu-Leu-Asp-Arg-Ile-Cys-Gly-Tyr-Gly-Thr- Ala-Arg-Cys-Arg-Lys-Lys-Cys-Arg-Ser-Gln- Glu-Tyr-Arg-Ile-Gly-Arg-Cys-Pro-Asn-Thr- Tyr-Ala-Cys-Cys-Leu-Arg-Lys (Disulfide bonds between Cys^{6}-Cys^{33}, Cys^{13}-Cys^{27}, and Cys^{17}-Cys^{34}) (M.W. 4366.0) $C_{180}H_{295}N_{63}O_{52}S_6$ Purity Information: QE See page IV (XVI)	Vial	0.1 mg	22,000

Antimicrobial Peptide / Chemoattractant for Monocytes

28 Human β-defensins were predicted in five gene clusters using a computational search approach[1]. Among others, **hBD-4**, was proposed based on the cDNA sequence analysis, the precursor of which is composed of 72 amino acid residues. Although natural **hBD-4**, as far as we know, has not yet been isolated, **hBD-4** was tentatively designed as the peptide corresponding to the positions between 25 and 61 in the precursor sequence [hereafter the term "**hBD-4**" is used for this peptide. Chemically synthesized **hBD-4** was confirmed to share the conserved disulfide connectivity of the β-defensin family of peptides by the combination of enzymatic digestions and Edman degradation reaction[2].

Using this chemically synthesized **hBD-4**, the following observations were reported[2]: **i)** **hBD-4** elicits salt-sensitive antimicrobial activities against both Gram-positive and Gram-negative bacteria in human respiratory epithelial cells; **ii)** the most active antimicrobial activity is detected against *Pseudomonas aeruginosa* at 4.1 μg/ml; and **iii)** **hBD-4** is a chemoattractant for human blood monocytes at 10 nM, but not for neutrophiles and eosinophiles. Interestingly, antimicrobial activities in the lungs were inducible by the infection and subsequent activation of protein kinase C, thus differing from the activation mechanism from hBD-2 and hBD-3, which are induced in response to the stimulation by TNF-α, IL-1α, IL-6 or interferon α. **hBD-4** mRNA was expressed abundantly in testis and the stomach, and to a lesser extent but significantly in the uterus, neutrophiles thyroid, lungs, and kidney.

hBD-4, which is regulated by specific stimulation that differs from those in hBD-2 and hBD-3, should be an essential component in clarifying the host defense mechanism in humans. Later, the existence of the immunoreactive **hBD-4** in the body was reported[3]. Also, hBD-4 induces mast cell degranulation, prostaglandin D_2 production, intracellular Ca^{2+} mobilization and chemotaxis[4].

1) B.C. Schutte, J.P. Mitros, J.A. Bartlett, J.D. Walters, H. Peng Jia, M.J. Welsh, T.L. Casavant, and P.B. McCray, Jr., *Proc. Natl. Acad. Sci. U.S.A.*, **99**, 2129 (2002). (*β-Defensin Family Peptides*)
2) J.-R.C. García, A. Krause, S. Schulz, F.-J. Rodríguez-Jiménez, E. Klüver, K. Adermann, U. Forssmann, A. Frimpong-Boateng, R. Bals, and W.-G. Forssmann, *FASEB J.*, **15**, 1819 (2001). (*Original; hBD-4 & S-S Bond*)
3) S. Yanagi, J.-i. Ashitani, H. Ishimoto, Y. Date, H. Mukae, N. Chino, and M. Nakazato, *Respiratory Res.*, **6**, 130 (2005). (*Pharmacol. & Immunohistochem.*)
4) X. Chen, F. Niyonsaba, H. Ushio, M. Hara, H. Yokoi, K. Matsumoto, H. Saito, I. Nagaoka, S. Ikeda, K. Okumura, and H. Ogawa, *Eur. J. Immunol.*, **37**, 434 (2007). (*Pharmacol.*)
5) N. Chino, S. Kubo, H. Nishio, Y. Nishiuchi, M. Nakazato, and T. Kimura, *Int. J. Pept. Res. Ther.*, **12**, 203 (2006). (*Chem. Synthesis & Pharmacol.*)

Delta Sleep-Inducing Peptide (DSIP)

Code	Compound			Price:Yen
4054-v	**Delta Sleep-Inducing Peptide**	Vial	0.5 mg	4,300
-20℃	**DSIP**			
	Trp-Ala-Gly-Gly-Asp-Ala-Ser-Gly-Glu			
	(M.W. 848.81) $C_{35}H_{48}N_{10}O_{15}$ [62568-57-4]			
4054	**Delta Sleep-Inducing Peptide**	Bulk	25 mg	50,000
-20℃	**DSIP**			
	Trp-Ala-Gly-Gly-Asp-Ala-Ser-Gly-Glu • $4H_2O$			
	(M.W. 848.81 • 72.06) $C_{35}H_{48}N_{10}O_{15}$ • $4H_2O$ [62568-57-4]			

1) G.A. Schoenenberger and M. Monnier, *Proc. Natl. Acad. Sci. U.S.A.*, **74**, 1282 (1977). (*Original*)
2) M. Monnier, L. Dudler, R. Gachter, P.F. Maier, H.J. Tobler, and G.A. Schoenenberger, *Experientia*, **33**, 548 (1977). (*Pharmacol.*)

Dendrotoxin

4330-s	**Dendrotoxin I**	Vial	0.1 mg	30,000
-20℃	**(Black mamba, *Dendroaspis polylepis polylepis*)**			

Pyr-Pro-Leu-Arg-Lys-Leu-Cys-Ile-Leu-His-
Arg-Asp-Pro-Gly-Arg-Cys-Tyr-Gln-Lys-Ile-
Pro-Ala-Phe-Tyr-Tyr-Asn-Gln-Lys-Lys-Lys-
Gln-Cys-Glu-Gly-Phe-Thr-Trp-Ser-Gly-Cys-
Gly-Gly-Asn-Ser-Asn-Arg-Phe-Lys-Thr-Ile-
Glu-Glu-Cys-Arg-Arg-Thr-Cys-Ile-Arg-Lys

(Disulfide bonds between Cys^{7}-Cys^{57}, Cys^{16}-Cys^{40}, and Cys^{32}-Cys^{53})
(M.W. 7133.2) $C_{312}H_{487}N_{97}O_{84}S_6$ [107950-33-4]

Voltage-Dependent K^+ Channel Blocker

1) D.J. Strydom, *Nature New Biol.*, **243**, 88 (1973). (*Original*)
2) J.-N. Bidard, C. Mourre, and M. Lazdunski, *Biochem. Biophys. Res. Commun.*, **143**, 383 (1987). (*Pharmacol.*)
3) A.L. Harvey, D.L. Marshall, F.A. De-Allie, and P.N. Strong, *Biochem. Biophys. Res. Commun.*, **163**, 394 (1989). (*Pharmacol.*)
4) H. Nishio, T. Inui, Y. Nishiuchi, C.L.C. De Medeiros, E.G. Rowan, A.L. Harvey, E. Katoh, T. Yamazaki, T. Kimura, and S. Sakakibara, *J. Pept. Res.*, **51**, 355 (1998). (*Chem. Synthesis & Correction of Sequence; Asp^{12}*)

Deamino-Dicarba-Arginine Vasopressin See Code 4026 **[$Asu^{1,6}$, Arg^{8}]-Vasopressin** on page 150

Deamino-Dicarba-Arginine Vasotocin See Code 4027 **[$Asu^{1,6}$, Arg^{8}]-Vasotocin** on page 151

Deamino-Dicarba-Oxytocin See Code 4025 **[$Asu^{1,6}$]-Oxytocin** on page 117

Diabetes-Associated Peptide (DAP) See Code 4219 **Amylin (Human)** and Code 4220 **Amylin (Rat)** on page 10

Dermcidin-1L / DCD

Code	Compound			Price:Yen
4454-s New -20℃	**Dermcidin-1L (Human)** **DCD-1L (Human)** 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. 4818.4) $C_{210}H_{359}N_{57}O_{71}$	Vial	0.1 mg	20,000

Antimicrobial Peptide in Sweat Glands

Dermcidin is a constitutively secreted antimicrobial peptide in human sweat[1]. Dermcidin is revealed to be a 110-residue protein by cDNA analysis, which is proteolytically processed to several components with variable charges. **Dermcidin-1L** is one of such processed peptides with anionic property, which corresponds to the carboxyl-terminal 48-residues of the precursor protein[1,2]. Studies using **dermcidin-1L** reported so far include: **i)** **dermcidin-1L** is active against Gram-positive and negative bacteria and fungus (1-100 μg/ml) [1], **ii)** in patients with atopic dermatitis the amounts of **dermicidin-1L** and other dermcidin-derived peptides are reduced[3], and **iii)** **dermcidin-1L** activates human keratinocytes, inducing the generation of cytokines and chemokines (2.5-20 μg/ml)[4]. **Dermcidin-1L** does not show membrane permeability, thus, the mechanism exerting antimicrobial activity of **dermcidin-1L** is distinct from that of other antimicrobial peptide, LL-37 (Code 4445-s)[5].

Dermcidin-1L in sweat may be essential for the battle with infectious pathogens on the human body surface, therefore it will be an important tool in the host defense research.

1) 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*)
2) S. Rieg, H. Steffen, S. Seeber, A. Humeny, H. Kalbacher, K. Dietz, C. Garbe, and B. Schittek, *J. Immunol.*, **174**, 8003 (2005) (*Endogenous Form*)
3) 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.*)
4) F. Niyonsaba, A. Suzuki, H. Ushio, I. Nagaoka, H. Ogawa, and K. Okumura, *Br. J. Dermatol.*, **160**, 243 (2009). (*Pharmacol.*)
5) I. Senyürek, 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.*)

Dynorphins

1) J. Hughes, *Br. Med. Bull.*, **39**, 17 (1983). (*Review*)
2) A.P. Smith and N.M. Lee, *Annu. Rev. Pharmacol. Toxicol.*, **28**, 123 (1988). (*Review*)
3) M. Simonato and P. Romualdi, *Prog. Neurobiol.*, **50**, 557 (1996). (*Review*)

Code	Compound			Price:Yen
4080-v -20℃	**Dynorphin A (Human, 1-13)** **(Porcine, Rat, Bovine)** Tyr-Gly-Gly-Phe-Leu-Arg-Arg-Ile-Arg-Pro-Lys-Leu-Lys (M.W. 1604.0) $C_{75}H_{126}N_{24}O_{15}$ [72957-38-1]	Vial	0.5 mg	6,600

1) A. Goldstein, S. Tachibana, L.I. Lowney, M. Hunkapiller, and L. Hood, *Proc. Natl. Acad. Sci. U.S.A.*, **76**, 6666 (1979). (*Original; Porcine*)
2) S. Horikawa, T. Takai, M. Toyosato, H. Takahashi, M. Noda, H. Kakidani, T. Kubo, T. Hirose, S. Inayama, H. Hayashida, T. Miyata, and S. Numa, *Nature*, **306**, 611 (1983). (*Nucleotide Seq.; Human*)

4108-v -20℃	**Dynorphin A (Human)** **(Porcine, Rat, Bovine)** Tyr-Gly-Gly-Phe-Leu-Arg-Arg-Ile-Arg-Pro-Lys-Leu-Lys-Trp-Asp-Asn-Gln (M.W. 2147.5) $C_{99}H_{155}N_{31}O_{23}$ [80448-90-4]	Vial	0.5 mg	12,500

1) S. Tachibana, K. Araki, S. Ohya, and S. Yoshida, *The 1981 International Narcotic Research Conference, Kyoto*, July 1981. (*Original*)
2) A. Goldstein, W. Fischli, L.I. Lowney, M. Hunkapiller, and L. Hood, *Proc. Natl. Acad. Sci. U.S.A.*, **78**, 7219 (1981). (*Original; Porcine*)
3) S. Horikawa, T. Takai, M. Toyosato, H. Takahashi, M. Noda, H. Kakidani, T. Kubo, T. Hirose, S. Inayama, H. Hayashida, T. Miyata, and S. Numa, *Nature*, **306**, 611 (1983). (*Nucleotide Seq.; Human*)
4) O. Civelli, J. Douglass, A. Goldstein, and E. Herbert, *Proc. Natl. Acad. Sci. U.S.A.*, **82**, 4291 (1985). (*Nucleotide Seq.; Rat*)

Elafin

4243-v -20℃	**Elafin (Human)** Ala-Gln-Glu-Pro-Val-Lys-Gly-Pro-Val-Ser-Thr-Lys-Pro-Gly-Ser-Cys-Pro-Ile-Ile-Leu-Ile-Arg-Cys-Ala-Met-Leu-Asn-Pro-Pro-Asn-Arg-Cys-Leu-Lys-Asp-Thr-Asp-Cys-Pro-Gly-Ile-Lys-Lys-Cys-Cys-Glu-Gly-Ser-Cys-Gly-Met-Ala-Cys-Phe-Val-Pro-Gln (Disulfide bonds between Cys^{16}-Cys^{45},Cys^{23}-Cys^{49},Cys^{32}-Cys^{44},and Cys^{38}-Cys^{53}) (M.W. 5999.1) $C_{254}H_{416}N_{72}O_{75}S_{10}$	Vial	20 µg	20,000

Elastase-Specific Inhibitor from Human Skin / Innate Immune Factor

1) O. Wiedow, J.-M. Schröder, H. Gregory, J.A. Young, and E. Christophers, *J. Biol. Chem.*, **265**, 14791 (1990). (*Original*)
2) O. Wiedow, J.-M. Schröder, H. Gregory, J.A. Young, and E. Christophers, *J. Biol. Chem.*, **266**, 3356 (1991). (*Correction of Seq.*)
3) M. Tsunemi, H. Kato, Y. Nishiuchi, S. Kumagaye, and S. Sakakibara, *Biochem. Biophys. Res. Commun.*, **185**, 967 (1992). (*Chem. Synthesis & Biochem.*)
4) M. Tsunemi, Y. Matsuura, S. Sakakibara, and Y. Katsube, *Biochemistry*, **35**, 11570 (1996). (*Biochem.; Crystal Structure of Elafin-Pancreatic Elastase Complex*)
5) L. Marischen, D. Wesch, J.-M. Schröder, O. Wiedow, and D. Kabelitz, *Scand. J. Immunol.*, **70**, 547 (2009). (*Pharmacol.*)
6) S.M. Iqbal, T.B. Ball, P. Levinson, L. Maranan, W. Jaoko, C. Wachihi, B.J. Pak, V.N. Podust, K. Broliden, T. Hirbod, R. Kaul, and F.A. Plummer, *AIDS*, **23**, 1669 (2009). (*Pharmacol.*)

Eledoisin Related Peptide

Code	Compound			Price:Yen
4003-v -20℃	**Eledoisin Related Peptide** Lys-Phe-Ile-Gly-Leu-Met-NH_2 (M.W. 706.94) $C_{34}H_{58}N_8O_6S$ [2990-43-4]	Vial	0.5 mg	2,600
4003 -20℃	**Eledoisin Related Peptide** Lys-Phe-Ile-Gly-Leu-Met-NH_2 • 2AcOH • $3H_2O$ (M.W. 706.94 • 120.10 • 54.05) $C_{34}H_{58}N_8O_6S$ • $2CH_3COOH$ • $3H_2O$ 1) S. Sakakibara and M. Fujino, *Bull. Chem. Soc. Jpn.*, **39**, 947 (1966). (*Chem. Synthesis*)	Bulk	25 mg 100 mg	25,000 71,000

Endokinins

4411-v -20℃	**Endokinin C (Human)** Lys-Lys-Ala-Tyr-Gln-Leu-Glu-His-Thr-Phe- Gln-Gly-Leu-Leu-NH_2 (M.W. 1674.9) $C_{78}H_{123}N_{21}O_{20}$ *Peptide in α-Tachykinin Precursor 4* 1) N.M. Page, N.J. Bell, S.M. Gardiner, I.T. Manyonda, K.J. Brayley, P.G. Strange, and P.J. Lowry, *Proc. Natl. Acad. Sci. U.S.A.*, **100**, 6245 (2003). (*Original*) 2) J.N. Pennefather, A. Lecci, M.L. Candenas, E. Patak, F.M. Pinto, and C.A. Maggi, *Life Sci.*, **74**, 1445 (2004). (*Review*) 3) N.M. Page, *Cell. Mol. Life Sci.*; **61**, 1652 (2004). (*Review*) 4) R. Naono, T. Nakayama, T. Ikeda, O. Matsushima, and T. Nishimori, *Brain Res.*, **1165**, 71 (2007). (*Pharmacol.*) 5) Y. Yang and S. Dong, *Peptides*, **31**, 94 (2010). (*Pharmacol.*)	Vial	0.5 mg	8,000
4412-v -20℃	**Endokinin D (Human)** Val-Gly-Ala-Tyr-Gln-Leu-Glu-His-Thr-Phe- Gln-Gly-Leu-Leu-NH_2 (M.W. 1574.8) $C_{73}H_{111}N_{19}O_{20}$ *Peptide in β-Tachykinin Precursor 4* 1) N.M. Page, N.J. Bell, S.M. Gardiner, I.T. Manyonda, K.J. Brayley, P.G. Strange, and P.J. Lowry, *Proc. Natl. Acad. Sci. U.S.A.*, **100**, 6245 (2003). (*Original*) 2) J.N. Pennefather, A. Lecci, M.L. Candenas, E. Patak, F.M. Pinto, and C.A. Maggi, *Life Sci.*, **74**, 1445 (2004). (*Review*) 3) N.M. Page, *Cell. Mol. Life Sci.*; **61**, 1652 (2004). (*Review*) 4) R. Naono, T. Nakayama, T. Ikeda, O. Matsushima, and T. Nishimori, *Brain Res.*, **1165**, 71 (2007). (*Pharmacol.*) 5) Y. Yang and S. Dong, *Peptides*, **31**, 94 (2010). (*Pharmacol.*)	Vial	0.5 mg	8,000

Endomorphins

1) J. Fichna, A. Janecka, J. Costentin, and J.-C. do Rego, *Pharmacol. Rev.*, **59**, 88 (2007). (*Review*)

4333-v -20℃	**Endomorphin-1*** **(Human, Bovine)** Tyr-Pro-Trp-Phe-NH_2 (M.W. 610.70) $C_{34}H_{38}N_6O_5$ [189388-22-5]	Vial	0.5 mg	2,100
4333 -20℃	**Endomorphin-1*** **(Human, Bovine)** Tyr-Pro-Trp-Phe-NH_2 • AcOH • H_2O (M.W. 610.70 • 60.05• 18.01) $C_{34}H_{38}N_6O_5$ • CH_3COOH• H_2O *Endogenous μ-Opiate Receptor Selective Agonist* 1) J.E. Zadina, L. Hackler, L.-J. Ge, and A.J. Kastin, *Nature*, **386**, 499 (1997). (*Original; Bovine*) 2) H.C. Champion, J.E. Zadina, A.J. Kastin, L. Hackler, L.J. Ge, and P.J. Kadowitz, *Biochem. Biophys. Res. Commun.*, **235**, 567 (1997). (*Pharmacol.*) 3) L.S. Stone, C.A. Fairbanks, T.M. Laughlin, H.O. Nguyen, T.M. Bushy, M.W. Wessendorf, and G.L. Wilcox, *Neuroreport*, **8**, 3131 (1997). (*Pharmacol.*) 4) L. Hackler, J.E. Zadina, L.J. Ge, and A.J. Kastin, *Peptides*, **18**, 1635 (1997). (*Isolation from Human Brain*)	Bulk	25 mg	48,000

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Endomorphins (continued)

Code	Compound			Price:Yen
4334-v -20℃	**Endomorphin-2*** **(Human, Bovine)** Tyr-Pro-Phe-Phe-NH_2 (M.W. 571.67) $C_{32}H_{37}N_5O_5$ [141801-26-5]	Vial	0.5 mg	2,100
4334 -20℃	**Endomorphin-2*** **(Human, Bovine)** Tyr-Pro-Phe-Phe-NH_2 • AcOH • H_2O (M.W. 571.67 • 60.05• 18.01) $C_{32}H_{37}N_5O_5$ • CH_3COOH• H_2O *Endogenous μ-Opiate Receptor Selective Agonist*	Bulk	25 mg	48,000

1) J.E. Zadina, L. Hackler, L.-J. Ge, and A.J. Kastin, *Nature*, **386**, 499 (1997). (*Original; Bovine*)
2) H.C. Champion, J.E. Zadina, A.J. Kastin, L. Hackler, L.J. Ge, and P.J. Kadowitz, *Biochem. Biophys. Res. Commun.*, **235**, 567 (1997). (*Pharmacol.*)
3) L.S. Stone, C.A. Fairbanks, T.M. Laughlin, H.O. Nguyen, T.M. Bushy, M.W. Wessendorf, and G.L. Wilcox, *Neuroreport*, **8**, 3131 (1997). (*Pharmacol.*)
4) L. Hackler, J.E. Zadina, L.J. Ge, and A.J. Kastin, *Peptides*, **18**, 1635 (1997). (*Isolation from Human Brain*)

Endorphins

1) A. Goldstein, *Ann. N. Y. Acad. Sci.*, **311**, 49 (1978). (*Review*)
2) F. Bloom, A. Bayon, E. Battenberg, E. French, L. Koda, G. Koob, M. Le Moal, J. Rossier, and W. Shoemaker, *Adv. Biochem. Psychopharmacol.*, **22**, 619 (1980). (*Review*)
3) P.A. Berger, H. Akil, S.J. Watson, and J.D. Barchas, *Annu. Rev. Med.*, **33**, 397 (1982). (*Review*)
4) F.E. Bloom, *Annu. Rev. Pharmacol. Toxicol.*, **23**, 151 (1983). (*Review*)

4055-v -20℃	**α-Endorphin** **β-Lipotropin (61-76)** Tyr-Gly-Gly-Phe-Met-Thr-Ser-Glu-Lys-Ser-Gln-Thr-Pro-Leu-Val-Thr (M.W. 1745.9) $C_{77}H_{120}N_{18}O_{26}S$ [59004-96-5]	Vial	0.5 mg	9,500

1) N. Ling, R. Burgus, and R. Guillemin, *Proc. Natl. Acad. Sci. U.S.A.*, **73**, 3942 (1976). (*Original; Porcine*)

4060-v -20℃	**β-Endorphin (Human)** **β-Lipotropin (Human, 61-91)** Tyr-Gly-Gly-Phe-Met-Thr-Ser-Glu-Lys-Ser-Gln-Thr-Pro-Leu-Val-Thr-Leu-Phe-Lys-Asn-Ala-Ile-Ile-Lys-Asn-Ala-Tyr-Lys-Lys-Gly-Glu (M.W. 3465.0) $C_{158}H_{251}N_{39}O_{46}S$ [61214-51-5]	Vial	0.5 mg	17,000

1) C.H. Li and D. Chung, *Nature*, **260**, 622 (1976). (*Original; Human*)
2) C.H. Li, D. Yamashiro, L.-F. Tseng, and H.H. Loh, *J. Med. Chem.*, **20**, 325 (1977). (*Chem. Synthesis & Biological Activity*)

4089-v -20℃	**γ-Endorphin** **β-Lipotropin (61-77)** Tyr-Gly-Gly-Phe-Met-Thr-Ser-Glu-Lys-Ser-Gln-Thr-Pro-Leu-Val-Thr-Leu (M.W. 1859.1) $C_{83}H_{131}N_{19}O_{27}S$	Vial	0.5 mg	11,500

1) N. Ling, R. Burgus, and R. Guillemin, *Proc. Natl. Acad. Sci. U.S.A.*, **73**, 3942 (1976). (*Original; Porcine*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

1) M. Yanagisawa and T. Masaki, *Trends Pharmacol. Sci.*, **10**, 374 (1989). (*Review*)
2) T. Sakurai, M. Yanagisawa, and T. Masaki, *Trends Pharmacol. Sci.*, **13**, 103 (1992). (*Review*)
3) A.F. James, Y. Urade, R.L. Webb, H. Karaki, I. Umemura, Y. Fujitani, K. Oda, T. Okada, R.W. Lappe, and M. Takai, *Cardiovasc. Drug Rev.*, **11**, 253 (1993). (*Review*)

List of Endothelin and Related Peptides

	Code	Compound	Quantity	Price: Yen	Page
Endothelin					
	4198-s	**Endothelin-1 (Human)**	0.1 mg vial	15,000	below
	4198-v	**Endothelin-1 (Human)**	0.5 mg vial	43,000	below
	4360-s	**Endothelin-1 (1-31) (Human)**	0.1 mg vial	20,000	60
	4209-s	**Endothelin-2 (Human)**	0.1 mg vial	15,000	60
	4199-s	**Endothelin-3 (Human)**	0.1 mg vial	15,000	60
	4199-v	**Endothelin-3 (Human)**	0.5 mg vial	43,000	60
	4211-s	**VIC (Mouse)**	0.1 mg vial	15,000	63
Big Endothelin-1					
	4208-s	**Big Endothelin-1 (Human, 1-38)**	0.1 mg vial	21,000	61
	4208-v	**Big Endothelin-1 (Human, 1-38)**	0.5 mg vial	56,000	61
	4207-s	**Big Endothelin-1 (Porcine, 1-39)**	0.1 mg vial	21,000	61
	4207-v	**Big Endothelin-1 (Porcine, 1-39)**	0.5 mg vial	56,000	61
	4266-s	**Big Endothelin-1 (Rat, 1-39)**	0.1 mg vial	22,000	61
Big Endothelin-2					
	4222-s	**Big Endothelin-2 (Human, 1-37)**	0.1 mg vial	21,000	61
	4253-s	**Big Endothelin-2 (Human, 1-38)**	0.1 mg vial	22,000	62
Big Endothelin-3					
	4223-s	**Big Endothelin-3 (Human, 1-41 Amide)**	0.1 mg vial	22,000	62
	4267-s	**Big Endothelin-3 (Rat, 1-41 Amide)**	0.1 mg vial	22,000	62
ET_B Receptor Agonist					
	4285-v	**Suc-[Glu^9, Ala^{11,15}]-Endothelin-1 (8-21)**	0.5 mg vial	13,000	62
Sarafotoxin					
	4206-s	**Sarafotoxin S6b**	0.1 mg vial	15,000	138
	4246-s	**Sarafotoxin S6c***	0.1 mg vial	15,000	138

* Sarafotoxin S6c is also known as an ET_B receptor agonist.

Code	Compound			Price:Yen
4198-s -20℃	**Endothelin-1 (Human)*** **(Porcine, Canine, Rat, Mouse, Bovine)** Cys-Ser-Cys-Ser-Ser-Leu-Met-Asp-Lys-Glu-Cys-Val-Tyr-Phe-Cys-His-Leu-Asp-Ile-Ile-Trp (Disulfide bonds between Cys^1-Cys^{15} and Cys^3-Cys^{11}) (M.W. 2491.9) $C_{109}H_{159}N_{25}O_{32}S_5$ [117399-94-7]	Vial	0.1 mg	15,000
4198-v -20℃	**Endothelin-1 (Human)*** **(Porcine, Canine, Rat, Mouse, Bovine)**	Vial	0.5 mg	43,000

1) M. Yanagisawa, H. Kurihara, S. Kimura, Y. Tomobe, M. Kobayashi, Y. Mitsui, Y. Yazaki, K. Goto, and M. Masaki, *Nature*, **332**, 411 (1988). (*Original*)
2) A. Inoue, M. Yanagisawa, S. Kimura, Y. Kasuya, T. Miyauchi, K. Goto, and T. Masaki, *Proc. Natl. Acad. Sci. U.S.A.*, **86**, 2863 (1989). (*Naming*)
3) T.X. Watanabe, Y. Itahara, K. Nakajima, S. Kumagaye, T. Kimura, and S. Sakakibara, *J. Cardiovasc. Pharmacol.*, **17 (Suppl. 7)**, S5 (1991). (*Pharmacol.*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Code	Compound			Price:Yen
4360-s -20℃	**Endothelin-1 (1-31) (Human)*** Cys-Ser-Cys-Ser-Ser-Leu-Met-Asp-Lys-Glu-Cys-Val-Tyr-Phe-Cys-His-Leu-Asp-Ile-Ile-Trp-Val-Asn-Thr-Pro-Glu-His-Val-Val-Pro-Tyr (Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11}) (M.W. 3628.2) $C_{162}H_{236}N_{38}O_{47}S_5$ [133972-52-8]	Vial	0.1 mg	20,000
4209-s -20℃	**Endothelin-2 (Human)*** **(Canine)** Cys-Ser-Cys-Ser-Ser-Trp-Leu-Asp-Lys-Glu-Cys-Val-Tyr-Phe-Cys-His-Leu-Asp-Ile-Ile-Trp (Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11}) (M.W. 2546.9) $C_{115}H_{160}N_{26}O_{32}S_4$ [123562-20-9]	Vial	0.1 mg	15,000
4199-s -20℃	**Endothelin-3 (Human)*** **(Porcine, Rat, Rabbit, Mouse)** Cys-Thr-Cys-Phe-Thr-Tyr-Lys-Asp-Lys-Glu-Cys-Val-Tyr-Tyr-Cys-His-Leu-Asp-Ile-Ile-Trp (Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11}) (M.W. 2643.0) $C_{121}H_{168}N_{26}O_{33}S_4$ [117399-93-6]	Vial	0.1 mg	15,000
4199-v -20℃	**Endothelin-3 (Human)*** **(Porcine, Rat, Rabbit, Mouse)** Purity Information : Qx See page IV (XVI)	Vial	0.5 mg	43,000

1) A. Nakano, F. Kishi, K. Minami, H. Wakabayashi, Y. Nakaya, and H. Kido, *J. Immunol.*, **159**, 1987 (1997). (*Original; New Endogenous Form*)
2) F. Kishi, K. Minami, N. Okishima, M. Murakami, S. Mori, M. Yano, Y. Niwa, Y. Nakaya, and H. Kido, *Biochem. Biophys. Res. Commun.*, **248**, 387 (1998). (*Pharmacol.*)
3) M. Yoshizumi, D. Inui, N. Okishima, H. Houchi, K. Tsuchiya, H. Wakabayashi, H. Kido, and T. Tamaki, *Eur. J. Pharmacol.*, **348**, 305 (1998). (*Pharmacol.*)
4) M. Yoshizumi, S. Kim, S. Kagami, A. Hamaguchi, K. Tsuchiya, H. Houchi, H. Iwao, H. Kido, and T. Tamaki, *Br. J. Pharmacol.*, **125**, 1019 (1998). (*Pharmacol.*)

1) A. Inoue, M. Yanagisawa, S. Kimura, Y. Kasuya, T. Miyauchi, K. Goto, and T. Masaki, *Proc. Natl. Acad. Sci. U.S.A.*, **86**, 2863 (1989). (*Original; Human Nucleotide Seq.*)
2) Y. Itoh, C. Kimura, H. Onda, and M. Fujino, *Nucleic Acid Res.*, **17**, 5389 (1989). (*Original; Canine cDNA*)

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1) M. Yanagisawa, A. Inoue, T. Ishikawa, Y. Kasuya, S. Kimura, S. Kumagaye, K. Nakajima, T.X. Watanabe, S. Sakakibara, K. Goto, and T. Masaki, *Proc. Natl. Acad. Sci. U.S.A.*, **85**, 6964 (1988). (*Original*)
2) A. Inoue, M. Yanagisawa, S. Kimura, Y. Kasuya, T. Miyauchi, K. Goto, and T. Masaki, *Proc. Natl. Acad. Sci. U.S.A.*, **86**, 2863 (1989). (*Naming*)
3) K. Nakajima, S. Kumagaye, H. Nishio, H. Kuroda, T.X. Watanabe, Y. Kobayashi, H. Tamaoki, T. Kimura, and S. Sakakibara, *J. Cardiovasc. Pharmacol.*, **13 (Suppl.5)**, S8 (1989). (*Chem. Synthesis & S-S Bond*)
4) K. Saida, N. Kometani, Y. Hirano, S. Oka, N. Tomizuka, and Y. Mitsui, *Peptide Chemistry 1996*, 133 (1997). (*cDNA Seq.; Mouse*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Endothelins (continued)

Code	Compound			Price:Yen
4208-s -20℃	**Big Endothelin-1 (Human, 1-38)*** Cys-Ser-Cys-Ser-Ser-Leu-Met-Asp-Lys-Glu- Cys-Val-Tyr-Phe-Cys-His-Leu-Asp-Ile-Ile- Trp-Val-Asn-Thr-Pro-Glu-His-Val-Val-Pro- Tyr-Gly-Leu-Gly-Ser-Pro-Arg-Ser (Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11}) (M.W. 4282.9) $C_{189}H_{282}N_{48}O_{56}S_5$ [120796-97-6]	Vial	0.1 mg	21,000
4208-v -20℃	**Big Endothelin-1 (Human, 1-38)***	Vial	0.5 mg	56,000

1) Y. Itoh, M. Yanagisawa, S. Ohkubo, C. Kimura, T. Kosaka, A. Inoue, N. Ishida, Y. Mitsui, H. Onda, M. Fujino, and T. Masaki, *FEBS Lett.*, **231**, 440 (1988). (*Original*)
2) T. Kashiwabara, Y. Inagaki, H. Ohta, A. Iwamatsu, M. Nomizu, A. Morita, and K. Nishikori, *FEBS Lett.*, **247**, 73 (1989). (*Pharmacol.*)

4207-s -20℃	**Big Endothelin-1 (Porcine, 1-39)*** Cys-Ser-Cys-Ser-Ser-Leu-Met-Asp-Lys-Glu- Cys-Val-Tyr-Phe-Cys-His-Leu-Asp-Ile-Ile- Trp-Val-Asn-Thr-Pro-Glu-His-Ile-Val-Pro- Tyr-Gly-Leu-Gly-Ser-Pro-Ser-Arg-Ser (Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11}) (M.W. 4384.0) $C_{193}H_{289}N_{49}O_{58}S_5$ [120796-99-8]	Vial	0.1 mg	21,000
4207-v -20℃	**Big Endothelin-1 (Porcine, 1-39)***	Vial	0.5 mg	56,000

1) M. Yanagisawa, H. Kurihara, S. Kimura, Y. Tomobe, M. Kobayashi, Y. Mitsui, Y. Yazaki, K. Goto, and T. Masaki, *Nature*, **332**, 411 (1988). (*Original*)
2) T. Kashiwabara, Y. Inagaki, H. Ohta, A. Iwamatsu, M. Nomizu, A. Morita, and K. Nishikori, *FEBS Lett.*, **247**, 73 (1989). (*Pharmacol.*)

4266-s -20℃	**Big Endothelin-1 (Rat, 1-39)*** Cys-Ser-Cys-Ser-Ser-Leu-Met-Asp-Lys-Glu- Cys-Val-Tyr-Phe-Cys-His-Leu-Asp-Ile-Ile- Trp-Val-Asn-Thr-Pro-Glu-Arg-Val-Val-Pro- Tyr-Gly-Leu-Gly-Ser-Pro-Ser-Arg-Ser (Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11}) (M.W. 4389.0) $C_{192}H_{292}N_{50}O_{58}S_5$	Vial	0.1 mg	22,000

1) T. Sakurai, M. Yanagisawa, A. Inoue, U.S. Ryan, S. Kimura, Y. Mitsui, K. Goto, and T. Masaki, *Biochem. Biophys. Res. Commun.*, **175**, 44 (1991). (*Original; cDNA*)

4222-s -20℃	**Big Endothelin-2 (Human, 1-37)*** Cys-Ser-Cys-Ser-Ser-Trp-Leu-Asp-Lys-Glu-Cys- Val-Tyr-Phe-Cys-His-Leu-Asp-Ile-Ile-Trp-Val- Asn-Thr-Pro-Glu-Gln-Thr-Ala-Pro-Tyr-Gly-Leu- Gly-Asn-Pro-Pro (Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11}) (M.W. 4183.7) $C_{188}H_{269}N_{45}O_{56}S_4$ [132699-72-0] Purity Information: Qx See page IV (XVI)	Vial	0.1 mg	21,000

1) S. Ohkubo, K. Ogi, M. Hosoya, H. Matsumoto, N. Suzuki, C. Kimura, H. Onda, and M. Fujino, *FEBS Lett.*, **274**, 136 (1990). (*Original; cDNA*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Code	Compound			Price:Yen
4253-s -20℃	**Big Endothelin-2 (Human, 1-38)*** Cys-Ser-Cys-Ser-Ser-Trp-Leu-Asp-Lys-Glu-Cys-Val-Tyr-Phe-Cys-His-Leu-Asp-Ile-Ile-Trp-Val-Asn-Thr-Pro-Glu-Gln-Thr-Ala-Pro-Tyr-Gly-Leu-Gly-Asn-Pro-Pro-Arg (Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11}) (M.W. 4339.9) $C_{194}H_{281}N_{49}O_{57}S_4$ Purity Information: Qx See page IV (XVI) 1) S. Ohkubo, K. Ogi, M. Hosoya, H. Matsumoto, N. Suzuki, C. Kimura, H. Onda, and M. Fujino, *FEBS Lett.*, **274**, 136 (1990). (*Original; cDNA*) 2) T. Kosaka, N. Suzuki, Y. Ishibashi, H. Matsumoto, Y. Itoh, S. Ohkubo, K. Ogi, C. Kitada, H. Onda, and M. Fujino, *J. Biochem.*, **116**, 443 (1994). (*Biosynthesis*)	Vial	0.1 mg	22,000
4223-s -20℃	**Big Endothelin-3 (Human, 1-41 Amide)*** Cys-Thr-Cys-Phe-Thr-Tyr-Lys-Asp-Lys-Glu-Cys-Val-Tyr-Tyr-Cys-His-Leu-Asp-Ile-Ile-Trp-Ile-Asn-Thr-Pro-Glu-Gln-Thr-Val-Pro-Tyr-Gly-Leu-Ser-Asn-Tyr-Arg-Gly-Ser-Phe-Arg-NH_2 (Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11}) (M.W. 4923.5) $C_{223}H_{322}N_{56}O_{63}S_4$ 1) K.D. Bloch, R.L. Eddy, T.B. Shows, and T. Quertermous, *J. Biol. Chem.*, **264**, 18156 (1989). (*Original; cDNA*) 2) T. Kosaka, N. Suzuki, Y. Ishibashi, H. Matsumoto, Y. Itoh, S. Ohkubo, K. Ogi, C. Kitada, H. Onda, and M. Fujino, *J. Biochem.*, **116**, 443 (1994). (*Original; Biosynthesis*) • This compound is distributed through Peptide Institute, Inc. under the license of Takeda Pharmaceutical Company Limited.	Vial	0.1 mg	22,000
4267-s -20℃	**Big Endothelin-3 (Rat, 1-41 Amide)*** Cys-Thr-Cys-Phe-Thr-Tyr-Lys-Asp-Lys-Glu-Cys-Val-Tyr-Tyr-Cys-His-Leu-Asp-Ile-Ile-Trp-Ile-Asn-Thr-Pro-Glu-Gln-Thr-Val-Pro-Tyr-Gly-Leu-Ser-Asn-His-Arg-Gly-Ser-Leu-Arg-NH_2 (Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11}) (M.W. 4863.5) $C_{217}H_{322}N_{58}O_{62}S_4$ 1) R. Shiba, T. Sakurai, G. Yamada, H. Morimoto, A. Saito, T. Masaki, and K. Goto, *Biochem. Biophys. Res. Commun.*, **186**, 588 (1992). (*Original; cDNA*)	Vial	0.1 mg	22,000
4285-v -20℃	**Suc-[Glu^{9}, $Ala^{11,15}$]-Endothelin-1 (8-21)*** **IRL 1620** Suc-Asp-Glu-Glu-Ala-Val-Tyr-Phe-Ala-His-Leu-Asp-Ile-Ile-Trp (Suc: Succinyl) (M.W. 1820.9) $C_{86}H_{117}N_{17}O_{27}$ [142569-99-1] *ET_B Receptor Selective Agonist* 1) M. Takai, I. Umemura, K. Yamasaki, T. Watakabe, Y. Fujitani, K. Oda, Y. Urade, T. Inui, T. Yamamura, and T. Okada, *Biochem. Biophys. Res. Commun.*, **184**, 953 (1992). (*Original*) 2) S.S. Shetty, T. Okada, R.L. Webb, D. DelGrande, and R.W. Lappe, *Biochem. Biophys. Res. Commun.*, **191**, 459 (1993). (*Pharmacol.*) 3) W.G. Haynes, A.P. Davenport, and D.J. Webb, *Trends Pharmacol. Sci.*, **14**, 225 (1993). (*Report; 3rd Int. Conf. Endothelin*) 4) A.F. James, Y. Urade, R.L. Webb, H. Karaki, I. Umemura, Y. Fujitani, K. Oda, T. Okada, R.W. Lappe, and M. Takai, *Cardiovasc. Drug Rev.*, **11**, 253 (1993). (*Review*)	Vial	0.5 mg	13,000

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Endothelins (continued)

Code	Compound			Price:Yen
4211-s -20℃	**VIC (Mouse)***	Vial	0.1 mg	15,000
	Vasoactive Intestinal Contractor (Mouse) Cys-Ser-Cys-Asn-Ser-Trp-Leu-Asp-Lys-Glu-Cys-Val-Tyr-Phe-Cys-His-Leu-Asp-Ile-Ile-Trp (Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11}) (M.W. 2573.9) $C_{116}H_{161}N_{27}O_{32}S_4$ 1) N. Ishida, K. Tsujioka, M. Tomoi, K. Saida, and Y. Mitsui, *FEBS Lett.*, **247**, 337 (1989). (*Original*) 2) K. Saida, Y. Mitsui, and N. Ishida, *J. Biol. Chem.*, **264**, 14613 (1989). (*Original; Nucleotide Seq.*)			

Endothelin Related Peptides

Sarafotoxin S6b See Code 4206 on page 138

Sarafotoxin S6c See Code 4246 on page 138

Endothelium-Derived Relaxing Factor Inhibitor (Synthetic) (Nitric Oxide Synthase Inhibitor)
See Code 2005 **Arg(NO_2)** on page 301

Enkephalins

4043-v -20℃	**Leucine-Enkephalin** **(Human, Porcine, Bovine, Rat, Mouse)** Tyr-Gly-Gly-Phe-Leu (M.W. 555.62) $C_{28}H_{37}N_5O_7$ [58822-25-6]	Vial	0.5 mg	2,100
4043 -20℃	**Leucine-Enkephalin** **(Human, Porcine, Bovine, Rat, Mouse)** Tyr-Gly-Gly-Phe-Leu • H_2O (M.W. 555.62 •18.02) $C_{28}H_{37}N_5O_7$ • H_2O [58822-25-6] 1) J. Hughes, T.W. Smith, H.W. Kosterlitz, L.A. Fothergill, B.A. Morgan, and H.R. Morris, *Nature*, **258**, 577 (1975). (*Original; Porcine*) 2) M. Comb, P.H. Seeburg, J. Adelman, L. Eiden, and E. Herbert, *Nature*, **295**, 663 (1982). (*cDNA Seq.; Human*) 3) M. Noda, Y. Furutani, H. Takahashi, M. Toyosato, T. Hirose, S. Inayama, S. Nakanishi, and S. Numa, *Nature*, **295**, 202 (1982). (*cDNA Seq.; Bovine*) 4) K. Yoshikawa, C. Williams, and S.L. Sabol, *J. Biol. Chem.*, **259**, 14301 (1984). (*cDNA Seq.; Rat*)	Bulk	25 mg 100 mg	11,000 31,000
4118-v -20℃	**Leucine-Enkephalin (Sulfated Form)** Tyr(SO_3H)-Gly-Gly-Phe-Leu (M.W. 635.69) $C_{28}H_{37}N_5O_{10}S$ [80632-52-6] 1) C.D. Unsworth and J. Hughes, *Nature*, **295**, 519 (1982). (*Original*)	Vial	0.5 mg	4,600
4042-v -20℃	**Methionine-Enkephalin** **(Human, Porcine, Bovine, Rat, Mouse)** Tyr-Gly-Gly-Phe-Met (M.W. 573.66) $C_{27}H_{35}N_5O_7S$ [58569-55-4]	Vial	0.5 mg	2,100
4042 -20℃	**Methionine-Enkephalin** **(Human, Porcine, Bovine, Rat, Mouse)** Tyr-Gly-Gly-Phe-Met • H_2O (M.W. 573.66 • 18.02) $C_{27}H_{35}N_5O_7S$ • H_2O [58569-55-4] 1) J. Hughes, T.W. Smith, H.W. Kosterlitz, L.A. Fothergill, B.A. Morgan, and H.R. Morris, *Nature*, **258**, 577 (1975). (*Original; Porcine*) 2) M. Comb, P.H. Seeburg, J. Adelman, L. Eiden, and E. Herbert, *Nature*, **295**, 663 (1982). (*cDNA Seq.; Human*) 3) M. Noda, Y. Furutani, H. Takahashi, M. Toyosato, T. Hirose, S. Inayama, S. Nakanishi, and S. Numa, *Nature*, **295**, 202 (1982). (*cDNA Seq.; Bovine*) 4) K. Yoshikawa, C. Williams, and S.L. Sabol, *J. Biol. Chem.*, **259**, 14301 (1984). (*cDNA Seq.; Rat*)	Bulk	25 mg 100 mg	15,000 44,000

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Enkephalins (continued)

Code	Compound			Price:Yen
4115-v -20℃	**[D-Ala^2,D-Leu^5]-Enkephalin** Tyr-D-Ala-Gly-Phe-D-Leu (M.W. 569.65) $C_{29}H_{39}N_5O_7$ [63631-40-3]	Vial	0.5 mg	2,400
4115 -20℃	**[D-Ala^2,D-Leu^5]-Enkephalin** Tyr-D-Ala-Gly-Phe-D-Leu • AcOH • H_2O (M.W. 569.65 • 60.05 • 18.02) $C_{29}H_{39}N_5O_7$ • CH_3COOH • H_2O [94825-57-7] 1) E.T. Wei, L.F. Tseng, H.H. Loh, and C.H. Li, *Life Sci.*, **21**, 321 (1977). (*Original*)	Bulk	25 mg 100 mg	23,000 65,000
4116-v -20℃	**[D-Ala^2,Met^5]-Enkephalin** Tyr-D-Ala-Gly-Phe-Met (M.W. 587.69) $C_{28}H_{37}N_5O_7S$ [61370-87-4]	Vial	0.5 mg	2,400
4116 -20℃	**[D-Ala^2,Met^5]-Enkephalin** Tyr-D-Ala-Gly-Phe-Met • AcOH • H_2O (M.W. 587.69 • 60.05 • 18.02) $C_{28}H_{37}N_5O_7S$ • CH_3COOH • H_2O [100929-62-2] 1) D.H. Coy, A.J. Kastin, A.V. Schally, O. Morin, N.G. Caron, F. Labrie, J.M. Walker, R. Fertel, G.G. Berntson, and C.A. Sandman, *Biochem. Biophys. Res. Commun.*, **73**, 632 (1976). (*Original; Chem. Synthesis*)	Bulk	25 mg	23,000
4117-v -20℃	**[D-Ala^2,Met^5]-Enkephalinamide** Tyr-D-Ala-Gly-Phe-Met-NH_2 (M.W. 586.70) $C_{28}H_{38}N_6O_6S$ [61090-95-7] 1) C.B. Pert, A. Pert, J.-K. Chang, and B.T.W. Fong, *Science*, **194**, 330 (1976). (*Original*) 2) D.H. Coy, A.J. Kastin, A.V. Schally, O. Morin, N.G. Caron, F. Labrie, J.M. Walker, R. Fertel, G.G. Berntson, and C.A. Sandman, *Biochem. Biophys. Res. Commun.*, **73**, 632 (1976). (*Original; Chem. Synthesis*)	Vial	0.5 mg	2,400

Exendin

4345-v -20℃	**Exendin (5-39)** **(Lizard, *Heloderma horridum*)** Thr-Phe-Thr-Ser-Asp-Leu-Ser-Lys-Gln-Met- Glu-Glu-Glu-Ala-Val-Arg-Leu-Phe-Ile-Glu- Trp-Leu-Lys-Asn-Gly-Gly-Pro-Ser-Ser-Gly- Ala-Pro-Pro-Pro-Ser-NH_2 (M.W. 3806.2) $C_{169}H_{262}N_{44}O_{54}S$ *GLP-1 Receptor Antagonist* 1) C. Montrose-Rafizadeh, H. Yang, B.D. Rodgers, A. Beday, L.A. Pritchette, and J. Eng, *J. Biol. Chem.*, **272**, 21201 (1997). (*Original; Potent Antagonist*) 2) J.-I. Oka, E. Suzuki, and Y. Kondo, *Brain Res.*, **878**, 194 (2000). (*Pharmacol.*)	Vial	0.5 mg	30,000

List of Feeding-Regulatory Peptides

Code	Compound	Quantity	Price: Yen	Page
Food Intake Stimulator				
4366-s	**Agouti-Related Protein (Human, 86-132)**	0.1 mg vial	30,000	8
4108-v	**Dynorphin A (Human)**	0.5 mg vial	12,500	56
4060-v	**β-Endorphin (Human)**	0.5 mg vial	17,000	58
4245-v	**Galanin (Human)**	0.5 mg vial	33,000	66
4244-v	**Galanin (Rat)**	0.5 mg vial	33,000	66
4391-s	**Galanin-like Peptide (Human, 1-60)**	0.1 mg vial	29,000	67
4372-s	**Ghrelin (Human)**	0.1 mg vial	20,000	69
4373-s	**Ghrelin (Rat)**	0.1 mg vial	20,000	69
4127-s	**GRF (Human)**	0.1 mg vial	12,000	73
4369-v	**Melanin-Concentrating Hormone (Human)**	0.5 mg vial	15,000	93
4158-s	**NPY (Human, Rat)**	0.1 mg vial	12,000	108
4162-s	**NPY (Porcine, Bovine)**	0.1 mg vial	12,000	108
4346-s	**Orexin-A (Human)**	0.1 mg vial	20,000	114
4348-s	**Orexin-B (Human)**	0.1 mg vial	10,000	115
4347-s	**Orexin-B (Rat, Mouse)**	0.1 mg vial	10,000	115
4419-s	**Pyroglutamylated RFamide Peptide (Human)**	0.1 mg vial	13,000	134
Food Intake Suppressor				
4421-s	**Adrenomedullin 2 / Intermedin (Human)**	0.1 mg vial	24,000	4
4422-s	**Adrenomedullin 2 / Intermedin (Rat)**	0.1 mg vial	24,000	4
4219-v	**Amylin (Human)**	0.5 mg vial	41,000	10
4086-v	**Bombesin**	0.5 mg vial	5,200	24
4350-s	**CART (Human, 55-102)**	0.1 mg vial	30,000	33
4351-s	**CART (Rat, 55-102)**	0.1 mg vial	30,000	33
4100-v	**CCK-Octapeptide (26-33) (Sulfated Form)**	0.5 mg vial	12,000	36
4160-s	**CGRP (Human)**	0.1 mg vial	11,500	34
4163-s	**CGRP (Rat)**	0.1 mg vial	11,500	35
4136-s	**CRF (Human, Rat)**	0.1 mg vial	12,000	43
4111-s	**CRF (Ovine)**	0.1 mg vial	12,000	43
4344-v	**GLP-1 (Human, 7-36 Amide)**	0.5 mg vial	29,000	71
4376-v	**GLP-2 (Human)**	0.5 mg vial	29,000	72
4088-s	**Insulin (Human)**	0.1 mg vial	13,000	84
4057-v	**α-MSH**	0.5 mg vial	5,700	94
4426-s	**Neuromedin S (Human)**	0.1 mg vial	11,000	103
4427-s	**Neuromedin S (Rat)**	0.1 mg vial	12,000	103
4377-v	**Neuromedin U (Rat)**	0.5 mg vial	20,000	104
4425-v	**Neuropeptide S (Human)**	0.5 mg vial	21,000	107
4029-v	**Neurotensin**	0.5 mg vial	3,300	110
4429-s	**Obestatin (Human)**	0.1 mg vial	8,000	113
4430-s	**Obestatin (Rat, Mouse)**	0.1 mg vial	8,000	113
4400-v	**Peptide YY (Human, 3-36)**	0.5 mg vial	39,000	124
4352-v	**Prolactin-Releasing Peptide (Human)**	0.5 mg vial	25,000	129
4353-v	**Prolactin-Releasing Peptide (Rat)**	0.5 mg vial	25,000	129
4387-s	**Stresscopin (Human)**	0.1 mg vial	16,000	142
4388-s	**Stresscopin-Related Peptide (Human)**	0.1 mg vial	18,000	143
4011-v	**TRH**	0.5 mg vial	1,900	147
4328-s	**Urocortin (Human)**	0.1 mg vial	14,000	143
4327-s	**Urocortin (Rat)**	0.1 mg vial	14,000	143
4383-s	**Urocortin II (Mouse)**	0.1 mg vial	14,000	144
Others				
4436-s	**Des-Acyl Ghrelin (Human)**	0.1 mg vial	12,000	70
4437-s	**Des-Acyl Ghrelin (Rat)**	0.1 mg vial	12,000	70
4178-s	**GIP (Human)**	0.1 mg vial	12,000	68
4403-v	**Neuropeptide W-30 (Human)**	0.5 mg vial	33,000	109
4404-v	**Neuropeptide W-30 (Rat)**	0.5 mg vial	33,000	109
4023-v	**Somatostatin**	0.5 mg vial	9,000	141

Fibronectin Active Fragment

See Code 4171 **Arg-Gly-Asp-Ser** on page 23 and 246
See Code 4189 **Gly-Arg-Gly-Asp-Ser** on page 23

FMRF-Amide See Code 4142 **Molluscan Cardioexcitatory Neuropeptide** on page 95 and 246

Galanin and Related Peptides

1) J.N. Crawley and G.L. Wenk, *Trends Neurosci.*, **12**, 278 (1989). (*Review*)
2) T. Bartfai, G. Fisone, and Ü. Langel, *Trends Pharmacol. Sci.*, **13**, 312 (1992). (*Review*)
3) R. Lang, A.L. Gundlach, and B. Kofler, *Pharmacol. Ther.*, **115**, 177 (2007). (*Review*)
4) I. Mechenthaler, *Cell. Mol. Life Sci.*, **65**, 1826 (2008). (*Review*)

Code	Compound			Price:Yen
4245-v -20°C	**Galanin (Human)***	Vial	0.5 mg	33,000

Gly-Trp-Thr-Leu-Asn-Ser-Ala-Gly-Tyr-Leu-
Leu-Gly-Pro-His-Ala-Val-Gly-Asn-His-Arg-
Ser-Phe-Ser-Asp-Lys-Asn-Gly-Leu-Thr-Ser

(M.W. 3157.4) $C_{139}H_{210}N_{42}O_{43}$ [119418-04-1]

1) M. Bersani, A.H. Johnsen, P. Højrup, B.E. Dunning, J.J. Andreasen, and J.J. Holst, *FEBS Lett.*, **283**, 189 (1991). (*Original*)

Code	Compound			Price:Yen
4244-v -20°C	**Galanin (Rat)***	Vial	0.5 mg	33,000

(Mouse)
Gly-Trp-Thr-Leu-Asn-Ser-Ala-Gly-Tyr-Leu-
Leu-Gly-Pro-His-Ala-Ile-Asp-Asn-His-Arg-
Ser-Phe-Ser-Asp-Lys-His-Gly-Leu-Thr-NH_2

(M.W. 3164.4) $C_{141}H_{211}N_{43}O_{41}$ [114547-31-8]

1) M.E. Vrontakis, L.M. Peden, M.L. Duckworth, and H.G. Friesen, *J. Biol. Chem.*, **262**, 16755 (1987). (*Original; Rat Pituitary Tumoral cDNA*)
2) L.M. Kaplan, E.R. Spindel, K.J. Isselbacher, and W.W. Chin, *Proc. Natl. Acad. Sci. U.S.A.*, **85**, 1065 (1988). (*Original; Rat Hypothalamic cDNA*)
3) J. Lundkvist, T. Land, U. Kahl, K. Bedecs, and T. Bartfai, *Neurosci. Lett.*, **200**, 121 (1995). (*Original; Mouse Hypothalamic cDNA*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Code	Compound			Price:Yen
4391-s -20℃	**Galanin-like Peptide (Human, 1-60)** **GALP (Human, 1-60)** Ala-Pro-Ala-His-Arg-Gly-Arg-Gly-Gly-Trp-Thr-Leu-Asn-Ser-Ala-Gly-Tyr-Leu-Leu-Gly-Pro-Val-Leu-His-Leu-Pro-Gln-Met-Gly-Asp-Gln-Asp-Gly-Lys-Arg-Glu-Thr-Ala-Leu-Glu-Ile-Leu-Asp-Leu-Trp-Lys-Ala-Ile-Asp-Gly-Leu-Pro-Tyr-Ser-His-Pro-Pro-Gln-Pro-Ser (M.W. 6500.3) $C_{292}H_{451}N_{83}O_{84}S$	Vial	0.1 mg	29,000

Ligand for Galanin Receptor 2 / Target Peptide for Feeding Regulation by Leptin

Galanin [Code 4245-v (human) and Code 4244-v (rat)] is one of the brain-gut peptides having various biological activities including feeding regulation. This peptide is known to be a food intake stimulator which interacts with both of the galanin receptor subtypes 1 and 2 (GalR1 and GalR2, respectively) in a relatively non-selective manner. GalR1 is primarily expressed in the central nervous system (CNS), whereas GalR2 is expressed in both peripheral tissue and the CNS.

In 1999, scientists at Takeda Pharmaceutical Company Limited discovered the GalR2-selective ligand in porcine hypothalamus. At the same time, they proposed the primary structures of the rat and human orthologues from the corresponding cDNA sequences[1]. This newly identified peptide, known as **galanin-like peptide (GALP)**, is composed of 60 amino acid residues. **GALP (9-21)** is identical to galanin (1-13) and the sequence homology among the species is high. When ^{125}I-labeled rat galanin is used as a ligand, porcine **GALP** interacts with GalR2 with an IC_{50} value of 0.24 nM, while the corresponding value for GalR1 is 4.3 nM, clearly indicating the receptor selectivity of **GALP**. Since then, additional data concerning the role of rat **GALP** in feeding have been reported dealing with: **i)** stimulation of food intake in rats[2,3], **ii)** control of its expression by leptin[4], and **iii)** crossing the blood brain barrier[5]. Recently review articles concerning the function of **GALP** in relation to galanin and the galanin receptor have also been published[6-8].

1) T. Ohtaki, S. Kumano, Y. Ishibashi, K. Ogi, H. Matsui, M. Harada, C. Kitada, T. Kurokawa, H. Onda, and M. Fujino, *J. Biol. Chem.*, **274**, 37041 (1999). (*Original*)
2) Y. Matsumoto, T. Watanabe, Y. Adachi, T. Itoh, T. Ohtaki, H. Onda, T. Kurokawa, O. Nishimura, and M. Fujino, *Neurosci. Lett.*, **322**, 67 (2002). (*Pharmacol.; Stimulation of Food Intake*)
3) H.-M. Tan, A.L. Gundlach, and M.J. Morris, *Neuropeptides*, **39**, 333 (2005). (*Pharmacol.; Exaggerated Feeding Response*)
4) A. Juréus, M.J. Cunningham, M.E. Mcclain, D.K. Clifton, and R.A. Steiner, *Endocrinology*, **141**, 2703 (2000). (*Pharmacol.*)
5) A.J. Kastin, V. Akerstrom, and L. Hackler, *Neuroendocrinology*, **74**, 423 (2001). (*Pharmacol.; Brain Entry*)
6) A.L. Gundlach, *Eur. J. Pharmacol.*, **440** 255 (2002). (*Review*)
7) P.S. Man and C.B. Lawrence, *Neuropharmacology*, **55**, (2008). (*Review*)
8) C.B. Lawrence, *Physiol. Behav.*, **97**, 515 (2009). (*Review*)

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GALP Splice Variant See Code 4449 **Alarin** on page 9

1) J.E. Jorpes and V. Mutt (eds.), Secretin, Cholecystokinin, Pancreozymin and Gastrin, *Handbook of Experimental Pharmacology*, **Vol. 34**, Springer-Verlag, Berlin, 1973. (*Review*)

Code	Compound			Price:Yen
4183-s -20℃	**Big Gastrin (Human)** (Ammonium Form) Pyr-Leu-Gly-Pro-Gln-Gly-Pro-Pro-His-Leu-Val-Ala-Asp-Pro-Ser-Lys-Lys-Gln-Gly-Pro-Trp-Leu-Glu-Glu-Glu-Glu-Glu-Ala-Tyr-Gly-Trp-Met-Asp-Phe-NH_2 (M.W. 3849.2) $C_{176}H_{251}N_{43}O_{53}S$ [60675-77-6] 1) A.M. Choudhury, G.W. Kenner, S. Moore, K.L. Ramachandran, W.D. Thorpe, R. Ramage, G.J. Dockray, R.A. Gregory, L. Hood, and M. Hunkapiller, *Hoppe-Seyler's Z. Physiol. Chem.*, **361**, 1719 (1980). (*Original; Chem. Synthesis*)	Vial	0.1 mg	13,000
4143-v -20℃	**Gastrin I (Human)** (Ammonium Form) Pyr-Gly-Pro-Trp-Leu-Glu-Glu-Glu-Glu-Glu-Ala-Tyr-Gly-Trp-Met-Asp-Phe-NH_2 (M.W. 2098.2) $C_{97}H_{124}N_{20}O_{31}S$ [10047-33-3] 1) H. Gregory, P.M. Hardy, D.S. Jones, G.W. Kenner, and R.C. Sheppard, *Nature*, **204**, 931 (1964). (*Original*) 2) J.C. Anderson, M.A. Barton, R.A. Gregory, P.M. Hardy, G.W. Kenner, J.K. MacLeod, J. Preston, R.C. Sheppard, and J.S. Morley, *Nature*, **204**, 933 (1964). (*Chem. Synthesis*)	Vial	0.5 mg	26,000
4004 -20℃	**Gastrin Related Peptide** Aoc-Trp-Met-Asp-Phe-NH_2 (Aoc: *t*-Amyloxycarbonyl) (M.W. 710.84) $C_{35}H_{46}N_6O_8S$ 1) Y. Ishii and H. Shinozaki, *Jpn. J. Pharmacol.*, **18**, 93 (1968). (*Pharmacol.*)	Bulk	25 mg 100 mg	9,600 25,000
4178-s -20℃	**GIP (Human)** **Gastric Inhibitory Polypeptide (Human)** **Glucose-dependent Insulinotropic Polypeptide (Human)** Tyr-Ala-Glu-Gly-Thr-Phe-Ile-Ser-Asp-Tyr-Ser-Ile-Ala-Met-Asp-Lys-Ile-His-Gln-Gln-Asp-Phe-Val-Asn-Trp-Leu-Leu-Ala-Gln-Lys-Gly-Lys-Lys-Asn-Asp-Trp-Lys-His-Asn-Ile-Thr-Gln (M.W. 4983.5) $C_{226}H_{338}N_{60}O_{66}S$ [100040-31-1]	Vial	0.1 mg	12,000
4178-v -20℃	**GIP (Human)** **Gastric Inhibitory Polypeptide (Human)** **Glucose-dependent Insulinotropic Polypeptide (Human)** 1) A.J. Moody, L. Thim, and I. Valverde, *FEBS Lett.*, **172**, 142 (1984). (*Original*) 2) N. Fujii, M. Sakurai, K. Akaji, M. Nomizu, H. Yajima, K. Mizuta, M. Aono, M. Moriga, K. Inoue, R. Hosotani, and T. Tobe, *Chem. Pharm. Bull.*, **34**, 2397 (1986). (*Glucose-dependent Insulinotropic Polypeptide*)	Vial	0.5 mg	41,000
4164-v -20℃	**GRP (Human)** **Gastrin Releasing Peptide (Human)** Val-Pro-Leu-Pro-Ala-Gly-Gly-Gly-Thr-Val-Leu-Thr-Lys-Met-Tyr-Pro-Arg-Gly-Asn-His-Trp-Ala-Val-Gly-His-Leu-Met-NH_2 (M.W. 2859.4) $C_{130}H_{204}N_{38}O_{31}S_2$ [93755-85-2] 1) E.R. Spindel, W.W. Chin, J. Price, L.H. Rees, G.M. Besser, and J.F. Habener, *Proc. Natl. Acad. Sci. U.S.A.*, **81**, 5699 (1984). (*Original; cDNA*)	Vial	0.5 mg	32,000

Gastrin Releasing Peptide (Human, 18-27) See Code 4153 **Neuromedin C** on page 102

Ghrelins and Des-Acyl Ghrelins

Code	Compound			Price:Yen
4372-s -20℃	**Ghrelin (Human)** (Trifluoroacetate Form) Gly-Ser-Ser(*n*-Octanoyl)-Phe-Leu-Ser-Pro-Glu-His-Gln-Arg-Val-Gln-Gln-Arg-Lys-Glu-Ser-Lys-Lys-Pro-Pro-Ala-Lys-Leu-Gln-Pro-Arg (M.W. 3370.9) $C_{149}H_{249}N_{47}O_{42}$ [258279-04-8] *Appetite Stimulating Peptide with Energy Homeostasis Regulation* • This compound is distributed through Peptide Institute, Inc. under the license of Dr. K. Kangawa.	Vial	0.1 mg	20,000
4373-s -20℃	**Ghrelin (Rat)** **(Mouse)** (Trifluoroacetate Form) Gly-Ser-Ser(*n*-Octanoyl)-Phe-Leu-Ser-Pro-Glu-His-Gln-Lys-Ala-Gln-Gln-Arg-Lys-Glu-Ser-Lys-Lys-Pro-Pro-Ala-Lys-Leu-Gln-Pro-Arg (M.W. 3314.8) $C_{147}H_{245}N_{45}O_{42}$ [258338-12-4] *Appetite Stimulating Peptide with Energy Homeostasis Regulation* • This compound is distributed through Peptide Institute, Inc. under the license of Dr. K. Kangawa.	Vial	0.1 mg	20,000

Ghrelin was discovered in 1999 as the endogenous ligand of growth-hormone secretagogue receptor[1]: **i)** **ghrelin** is a 28 residue peptide with an *n*-octanoyl group on Ser^3 and **ii)** the major ghrelin producing organ is the stomach. Since then, many researches have been carried out using synthetic **ghrelin**, clarifying that **ghrelin** is a multifunctional peptide. These functions include **i)** regulation of appetite, **ii)** cardiovascular functions, and so on, which are summarized as review articles[3)-12)].

1) M. Kojima, H. Hosoda, Y. Date, M. Nakazato, H. Matsuo, and K. Kangawa, *Nature*, **402**, 656 (1999). (*Original*)
2) P.L. Jeffery, R.P. Duncan, A.H. Yeh, R.A. Jaskolski, D.S. Hammond, A.C. Herington, and L.K. Chopin, *Endocrinology*, **146**, 432 (2005). (*Mouse RNA Seq.*)
3) C. Dieguez and F.F. Casanueva, *Eur. J. Endocrinol.*, **142**, 413 (2000). (*Review*)
4) G. Muccioli, M. Tschöp, M. Papotti, R. Deghenghi, M. Heiman, and E. Ghigo, *Eur. J. Pharmacol.*, **440**, 235 (2002). (*Review*)
5) G. Wang, H.-M. Lee, E. Englander, and G.H. Greeley, Jr., *Regul. Pept.*, **105**, 75 (2002). (*Review*)
6) A.J. van der Lely, M. Tschöp, M.L. Heiman, and E. Ghigo, *Endocr. Rev.*, **25**, 426 (2004). (*Review*)
7) M. Kojima and K. Kangawa, *Physiol. Rev.*, **85**, 495 (2005). (*Review*)
8) P. Pusztai, B. Sarman, E. Ruzicska, J. Toke, K. Racz, A. Somogyi, and Z. Tulassay, *Diabetes Metab. Res. Rev.*, **24**, 343 (2008). (*Review*)
9) P.K. Olszewski, H.B. Schioth, and A.S. Levine, *Brain Res. Rev.*, **58**, 160 (2008). (*Review*)
10) F. Ferrini, C. Salio, L. Lossi, and A. Merighi, *Curr.Neuropharmacol.*, **7**, 37 (2009). (*Review*)
11) I. Depoortere, *Regul.Pept.*, **156**, 13 (2009). (*Review*)
12) T. Lorenzi, R. Meli, D. Marzioni, M. Morroni, A. Baragli, M. Castellucci, O. Gualillo, and G. Muccioli, *Cytokine Growth Factor Rev.*, **20**, 137 (2009). (*Review*)

Code	Compound			Price:Yen
4436-s -20℃	**Des-Acyl Ghrelin (Human)** **Des-*n*-Octanoyl Ghrelin (Human)** (Trifluoroacetate Form) Gly-Ser-Ser-Phe-Leu-Ser-Pro-Glu-His-Gln-Arg-Val-Gln-Gln-Arg-Lys-Glu-Ser-Lys-Lys-Pro-Pro-Ala-Lys-Leu-Gln-Pro-Arg (M.W. 3244.7) $C_{141}H_{235}N_{47}O_{41}$ *Des-Octanoylated Ghrelin with Distinct Effect on Food Intake*	Vial	0.1 mg	12,000
4437-s -20℃	**Des-Acyl Ghrelin (Rat)** **Des-*n*-Octanoyl Ghrelin (Rat)** (Trifluoroacetate Form) Gly-Ser-Ser-Phe-Leu-Ser-Pro-Glu-His-Gln-Lys-Ala-Gln-Gln-Arg-Lys-Glu-Ser-Lys-Lys-Pro-Pro-Ala-Lys-Leu-Gln-Pro-Arg (M.W. 3188.6) $C_{139}H_{231}N_{45}O_{41}$ *Des-Octanoylated Ghrelin with Distinct Effect on Food Intake*	Vial	0.1 mg	12,000

In the survey of the endogenous form(s) of ghrelin, two major peptides were found to exist in tissues and plasma, which are ghrelin itself and des-octanoylated ghrelin (**des-acyl ghrelin**)[1]. Very interestingly, the plasma level of **des-acyl ghrelin** is excessive, so that the possible function of this particular form of the ghrelin peptide, **des-acyl ghrelin**, has been considered although growth hormone (GH) releasing activity of ghrelin through GH secretagogue receptor (GHSR) was abrogated by removing the octanoyl group. In the accumulating publications dealing with the function of **des-acyl ghrelin**, the following interesting aspects were pointed out by utilizing either rat or human peptide: **des-acyl ghrelin** may **i)** affect the insulin and glucose level in the body[2,3], **ii)** be an anorexic peptide through corticotropin-releasing factor type 2 receptor activation upon *i.p.* administration[4,5], and **iii)** be an orexigenic peptide[6]. In this last paper reported by Dr. Nakazato's group, they clarified that stimulation of food intake is observed upon *i.c.v.* injection of the peptide, and that this effect is generated through the orexin A neuron. Thus, they evaluated this effect to be afforded through a different target protein other than GHSR.

As is obvious from these findings, functional roles of **des-acyl ghrelin** in the regulation of food consumption seem to be largely conflicting. Therefore, further studies using synthetic **des-acyl ghrelin** are required to reach concrete conclusions about the actual role of **des-acyl ghrelin** in the body.

1) H. Hosoda, M. Kojima, H. Matsuo, and K. Kangawa, *Biochem. Biophys. Res. Commun.*, **279**, 909 (2000). (*Endogenous Form*)
2) F. Broglio, C. Gottero, F. Prodam, C. Gauna, G. Muccioli, M. Papotti, T. Abribat, A.J. Van Der Lely, and E. Ghigo, *J. Clin. Endocrinol. Metab.*, **89**, 3062 (2004). (*Pharmacol.; Antagonistic Effect*)
3) H. Iwakura, K. Hosoda, C. Son, J. Fujikura, T. Tomita, M. Noguchi, H. Ariyasu, K. Takaya, H. Masuzaki, Y. Ogawa, T. Hayashi, G. Inoue, T. Akamizu, H. Hosoda, M. Kojima, H. Itoh, S. Toyokuni, K. Kangawa, and K. Nakao, *J. Biol. Chem.*, **280**, 15247 (2005). (*Pharmacol.; Effect on Glucose Metabolism*)
4) A. Asakawa, A. Inui, M. Fujimiya, R. Sakamaki, N. Shinfuku, Y. Ueta, M.M. Meguid, and M. Kasuga, *Gut*, **54**, 18 (2005). (*Pharmacol.; Anorexic Peptide*)
5) C.-Y. Chen, A. Inui, A. Asakawa, K. Fujino, I. Kato, C.-C. Chen, N. Ueno, and M. Fujimiya, *Gastroenterology*, **129**, 8 (2005). (*Pharmacol.; Anorexic Peptide*)
6) K. Toshinai, H. Yamaguchi, Y. Sun, R.G. Smith, A. Yamanaka, T. Sakurai, Y. Date, M.S. Mondal, T. Shimbara, T. Kawagoe, N. Murakami, M. Miyazato, K. Kangawa, and M. Nakazato, *Endocrinology*, **147**, 2306 (2006). (*Pharmacol.; Orexigenic Peptide*)
7) J.-B. Soares, and A.F. Leite-Moreira, *Peptides*, **29**, 1255 (2008). (*Review*)
8) T. Inhoff, B. Wiedenmann, B.F. Klapp, H. Moennikes, and P. Kobelt, *Peptides*, **30**, 991 (2009). (*Review*)

GIF See Code 4023 **Somatostatin** on page 141

GIP See Code 4178 **GIP (Human)** on page 68

Glucagon

Code	Compound			Price:Yen
4098-s -20℃	**Glucagon (Human)** His-Ser-Gln-Gly-Thr-Phe-Thr-Ser-Asp-Tyr- Ser-Lys-Tyr-Leu-Asp-Ser-Arg-Arg-Ala-Gln- Asp-Phe-Val-Gln-Trp-Leu-Met-Asn-Thr (M.W. 3482.7) $C_{153}H_{225}N_{43}O_{49}S$ [16941-32-5] 1) P.J. Lefebvre and R.H. Unger (eds.), Glucagon, Pergamon Press, Oxford, 1972. (*Review*)	Vial	0.1 mg	12,000

Glucagon-like Peptides

1) E. Blázquez, E. Alvarez, M. Navarro, I. Roncero, F. Rodríguez-Fonseca, J.A. Chowen, and J.A. Zueco, *Mol. Neurobiol.*, **18**, 157 (1998). (*Review*)
2) G. van Dijk and T.E. Thiele, *Neuropeptides*, **33**, 406 (1999). (*Review*)
3) D.J. Drucker, *Gut*, **50**, 428 (2002). (*Review*)

Code	Compound			Price:Yen
4344-v -20℃	**Glucagon-like Peptide 1 (Human, 7-36 Amide)** **GLP-1 (Human, 7-36 Amide)** **(Bovine, Canine, Rat, Guinea pig)** 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-NH_2 (M.W. 3297.6) $C_{149}H_{226}N_{40}O_{45}$ [107444-51-9] 1) M.D. Turton, D. O'Shea, I. Gunn, S.A. Beak, C.M.B. Edwards, K. Meeran, S.J. Choi, G.M. Taylor, M.M. Heath, P.D. Lambert, J.P.H. Wilding, D.M. Smith, M.A. Ghatei, J. Herbert, and S.R. Bloom, *Nature*, **379**, 69 (1996). (*Original; CNS Effect on Feeding*) 2) M. Tang-Christensen, P.J. Larsen, R. Göke, A. Fink-Jensen, D.S. Jessop, M. Møller, and S.P. Sheikh, *Am. J. Physiol.*, **271**, R848 (1996). (*Original; CNS Effect on Drinking*) 3) G.van Dijk, T.E. Thiele, R.J. Seeley, S.C. Woods, and I.L. Bernstein, *Nature*, **385**, 214 (1997). (*Correspondence*)	Vial	0.5 mg	29,000
4280-v -20℃	**Glucagon-like Peptide 1 (Human, 7-37)** **GLP-1 (Human, 7-37)** **(Bovine, Canine, Rat, Guinea pig)** 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- Gly (M.W. 3355.7) $C_{151}H_{228}N_{40}O_{47}$ [106612-94-6] 1) G.G. Holz IV, W.M. Kühtreiber, and J.F. Habener, *Nature*, **361**, 362 (1993). (*Original*) 2) G.S. Meneilly, C.H.S. McIntosh, R.A. Pederson, J.F. Habener, R. Gingerich, J.M. Egan, and D. Elahi, *Diabetes Care*, **24**, 964 (2001). (*Pharmacol.*)	Vial	0.5 mg	29,000

Code	Compound			Price:Yen
4376-v −20℃	**Glucagon-like Peptide 2 (Human)** **GLP-2 (Human)** His-Ala-Asp-Gly-Ser-Phe-Ser-Asp-Glu-Met-Asn-Thr-Ile-Leu-Asp-Asn-Leu-Ala-Ala-Arg-Asp-Phe-Ile-Asn-Trp-Leu-Ile-Gln-Thr-Lys-Ile-Thr-Asp (M.W. 3766.1) $C_{165}H_{254}N_{44}O_{55}S$ [223460-79-5] *Food Intake Suppressor*	Vial	0.5 mg	29,000

The proglucagon gene encodes glucagon, glucagon-like peptide 1 (GLP-1) and GLP-2 tandemly. Among these, the location and function of GLP-1 have long been studied, showing that GLP-1 is one of the typical brain-gut peptides and has pleiotropic functions, including stimulation of insulin gene expression, regulation of food and water intake, etc.

The chemical structure of GLP-2 in human ileum was reported to be identical to the 33 amino acid residue peptide corresponding to proglucagon (126-158)[1]. GLP-2 is present in human plasma, the concentration of which was shown to be elevated 3- to 4-fold after ingestion of a meal[1]. Further studies revealed that GLP-2's immunoreactivity was distributed in rat brain, especially in the ventral part of the dorsomedial hypothalamic nucleus (DMH) (and also found in the paraventricular and arcuate nuclei). Central administration of GLP-2 decreases food intake in *ad libitum*-fed rats at concentrations above 5 μg[2]. This inhibition is effective for a short-duration. Surprisingly the GLP-1 receptor antagonist, exendin (9-39), reverses the GLP-2 induced anorexia, although the GLP-2 receptor is expressed in the compact part of the DMH. In addition, GLP-2 decreases NPY-induced food intake by 40%, but this peptide does not affect angiotensin II-induced drinking behavior[2].

1) B. Hartmann, A.H. Johnsen, C. Ørskov, K. Adelhorst, L. Thim, and J.J. Holst, *Peptides*, **21**, 73 (2000). (*Pharmacol.*)
2) M. Tang-Christensen, P.J. Larsen, J. Thulesen, J. Rømer, and N. Vrang, *Nat. Med.*, **6**, 802 (2000). (*Pharmacol.*)
3) D.J. Drucker, *Gut*, **50**, 428 (2002). (*Review*)
4) K. Wallis, J.R.F. Walters, and A. Forbes, *Aliment. Pharmacol. Ther.*, **25**, 365 (2007). (*Review*)
5) P.E. Dubé and P.L. Brubaker, *Am. J. Physiol. Endocrinol, Metab.*, **293**, E460 (2007). (*Review*)
6) K.J. Rowland and P.L. Brubaker, *Mol. Cell. Endocrinol.*, **288**, 63 (2008). (*Review*)
7) R. Yazbeck, G.S. Howarth, and C.A. Abbott, *Cytokine Growth Factor Rev.*, **20**, 175 (2009). (*Review*)
8) R. Yazbeck, C.A. Abbott, and G.S. Howarth, *Curr. Opin. Investig. Drugs*, **11**, 440 (2010). (*Review*)

Glucose-dependent Insulinotropic Polypeptide (Human) See Code 4178 **GIP (Human)** on page 68

GnRH (Human) See Code 4013 **LH-RH (Human)** on page 90

Growth Hormone Releasing Factor (GRF, GH-RH)

Code	Compound			Price:Yen
4127-s -20℃	**GRF (Human)** **Growth Hormone Releasing Factor (Human)** Tyr-Ala-Asp-Ala-Ile-Phe-Thr-Asn-Ser-Tyr-Arg-Lys-Val-Leu-Gly-Gln-Leu-Ser-Ala-Arg-Lys-Leu-Leu-Gln-Asp-Ile-Met-Ser-Arg-Gln-Gln-Gly-Glu-Ser-Asn-Gln-Glu-Arg-Gly-Ala-Arg-Ala-Arg-Leu-NH_2 (M.W. 5039.7) $C_{215}H_{358}N_{72}O_{66}S$ [83930-13-6]	Vial	0.1 mg	12,000
4127-v -20℃	**GRF (Human)** **Growth Hormone Releasing Factor (Human)**	Vial	0.5 mg	41,000

1) R. Guillemin, P. Brazeau, P. Böhlen, F. Esch, N. Ling, and W.B. Wehrenberg, *Science*, **218**, 585 (1982). (*Original; Pancreatic Tumor*)
2) N. Ling, F. Esch, P. Böhlen, P. Brazeau, W.B. Wehrenberg, and R. Guillemin, *Proc. Natl. Acad. Sci. U.S.A.*, **81**, 4302 (1984). (*Original; Hypothalamus*)

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GRP See Code 4164 **GRP (Human)** on page 68

GRP (18-27) See Code 4153 **Neuromedin C** on page 102

GsMTx-4

Code	Compound			Price:Yen
4393-s	**GsMTx-4**	Vial	0.1 mg	22,000
-20℃	**(Chilean Rose Tarantula, *Grammostola spatulata*)**			

Gly-Cys-Leu-Glu-Phe-Trp-Trp-Lys-Cys-Asn-
Pro-Asn-Asp-Asp-Lys-Cys-Cys-Arg-Pro-Lys-
Leu-Lys-Cys-Ser-Lys-Leu-Phe-Lys-Leu-Cys-
Asn-Phe-Ser-Phe-NH_2

(Reported disulfide bonds between Cys^2-Cys^{17}, Cys^9-Cys^{23}, and Cys^{16}-Cys^{30})

(M.W. 4095.8) $C_{185}H_{273}N_{49}O_{45}S_6$

Inhibitor for Cation-Selective Stretch-Activated Channels / Atrial Fibrillation Inhibiting Peptide

Mechanosensitive ion channels (MSCs) are ubiquitous from unicellular to multicellular organisms and participate in numerous physiological processes including touch and pain sensation, salt and fluid balance, blood pressure control, cell volume regulation, and turgor control[1]. Analysis of the functions mediated by these channels can be performed by utilizing a specific blocker with high selectivity to the particular channels. In the research of stretch-activated ion channels (SACs), one of MSCs, cationic metal, Gd^{3+}, and cationic compounds including amiloride, and cationic antibiotics were used as blockers, but reported to be non-selective (lack of specificity). In 2000, Professor F. Sachs of State University of New York at Buffalo discovered a peptidic toxin named **GsMTx-4** in the venom of the tarantula *Grammostola spatulata* and reported it to possess a specific blocking activity for stretch-activated currents[2]. **GsMTx-4** blocks: **i)** SAC current in outside-out patches from adult rat astrocytes (K_d=630 nM); **ii)** swelling-activated whole cell current (an inwardly rectifying cation selective current) in cardiac myocytes at 400 nM, (but not an outwardly rectifying Cl^- current); and **iii)** MSC current in normal rat kidney cells at 5 μM[2, 3]. Also, this peptide inhibits the atrial fibrillation associated with dilatation at 170 nM (anti-arrhythmic activity)[1, 4].

Primary sequence of **GsMTx-4** was clarified by cDNA cloning to be a 34-residue peptide possessing a post-translationally modified amide structure at its carboxyl-terminus[3]. Three disulfide linkages in the molecule were connected in the pattern of Cys1-Cys4, Cys2-Cys5, and Cys3-Cys6 (Cys numbering from the amino-terminus) during the determination of its solution structure, indicating that **GsMTx-4** is a member of "inhibitor cystine knot" peptides[5]. **GsMTx-4** should prove to be a useful tool for the study of the biological events initiated by the activation and inactivation of SACs. **GsMTx–4** also blocked the activation of TRPC6 (transient receptor potential channel 6) channels, expressed widely in vascular smooth muscle, is also reported[6].

1) O.P. Hamill and B. Martinac, *Physiol. Rev.*, **81**, 685 (2001). (*Review; MSCs*)
2) T.M. Suchyna, J.H. Johnson, K. Hamer, J.F. Leykam, D.A. Gage, H.F. Clemo, C.M. Baumgarten, and F. Sachs, *J. Gen. Physiol.*, **115**, 583 (2000). (*Original*)
3) K.L. Ostrow, A. Mammoser, T. Suchyna, F. Sachs, R. Oswald, S. Kubo, N. Chino, and P.A. Gottlieb, *Toxicon*, **42**, 263 (2003). (*Primary structure; cDNA Seq. & Pharmacol.*)
4) F. Bode, F. Sachs, and M.R. Franz, *Nature*, **409**, 35 (2001). (*Pharmacol.*)
5) R.E. Oswald, T.M. Suchyna, R. McFeeters, P. Gottlieb, and F. Sachs, *J. Biol. Chem.*, **277**, 34443 (2002). (*Solution Structure & S-S Bond*)
6) M.A. Spassova, T. Hewavitharana, W. Xu, J. Soboloff, and D.L. Gill, *Proc. Natl. Acad. Sci. U.S.A.*, **103**, 16586 (2006). (*Pharmacol.*)
7) C.L. Bowman, P.A. Gottlieb, T.M. Suchyna, Y.K. Murphy, and F. Sachs, *Toxicon*, **49**, 249 (2007). (*Review*)

Guangxitoxin-1E

Code	Compound			Price:Yen
4433-s -20℃	**Guangxitoxin-1E** **GxTX-1E** **(Tarantula, *Plesiophrictus 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 (Reported disulfide bonds between Cys^4-Cys^{19}, Cys^{11}-Cys^{24}, and Cys^{18}-Cys^{31}) (M.W. 3948.6) $C_{178}H_{248}N_{44}O_{45}S_7$ Purity Information: QE See page IV (XVI)	Vial	0.1 mg	22,000

Kv2.1/Kv2.2 Channel Blocker / Enhancer of Glucose-Dependent Insulin Secretion

Peptides with selective channel blocking activity have been used to clarify the specific function of the channels. Among them, **guangxitoxin-1E** (**GxTX-1E**), which was isolated from the venom of spider (*Plesiophrictus guangxiensis* sp. nov.), was identified as a unique blocker for the K^+ channels[1].

GxTX-1E blocks Kv2.1 and Kv2.2 (and to a lesser extent Kv4.3) selectively, with a half-maximal concentration of less than 1 nM. Furthermore, this peptide does not significantly affect the other K^+ channels, Ca^{2+} channels, nor Na^+ channels. In mouse β-cells, **GxTX-1E** inhibits 90% of delayed-rectifier K^+ current (I_{DR}) and, as for Kv2.1, shifts the voltage dependence of channel activation to more depolarized potentials, a characteristic of gating-modifier peptide. Kv2.1 voltage-dependent K^+ channels are known to be involved in **i)** enhancement of glucose-dependent insulin secretion[2] and **ii)** regulation of the pancreatic β-cell Ca^{2+} response to glucose[3].

All these effects are attractive characteristics in relation to an investigation into the etiology of type 2 diabetes. Therefore, **GxTX-1E** would be useful tool for the diabetic research.

1) 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). (*Original*)
2) 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*)
3) 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*)
4) J. Herrington, *Toxicon*, **49**, 231 (2007). (*Review*)
5) S. Lee, M. Milescu, H.H. Jung, J.Y. Lee, C.H. Bae, C.W. Lee, H.H. Kim, K.J. Swartz, and J.I. Kim, *Biochemistry*, **49**, 5134 (2010). (*Solution Structure & S-S Bond*)

1) L.R. Forte and M.G. Currie, *FASEB J.*, **9**, 643 (1995). (*Review*)
2) L.R. Forte, X.H. Fan, and F.K. Hamra, *Am. J. Kidney Dis.*, **28**, 296 (1996). (*Review*)
3) L.R. Forte, Jr., *Pharmacol. Ther.*, **104**, 137 (2004). (*Review*)

Code	Compound			Price:Yen
4274-s -20℃	**Guanylin (Human)** Pro-Gly-Thr-Cys-Glu-Ile-Cys-Ala-Tyr-Ala-Ala-Cys-Thr-Gly-Cys (Disulfide bonds between Cys^4-Cys^{12} and Cys^7-Cys^{15}) (M.W. 1458.7) $C_{58}H_{87}N_{15}O_{21}S_4$ [183200-12-6] *Guanylate Cyclase C Activator*	Vial	0.1 mg	10,000

1) R.C. Wiegand, J. Kato, M.D. Huang, K.F. Foc, J.F. Kachur, and M.G. Currie, *FEBS Lett.*, **311**, 150 (1992). (*Original; cDNA*)
2) F.J. de Sauvage, S. Keshav, W.-J. Kuang, N. Gillett, W. Henzel, and D.V. Goeddel, *Proc. Natl. Acad. Sci. U.S.A.*, **89**, 9089 (1992). (*Original; cDNA*)
3) M. Kuhn, M. Raida, K. Adermann, P. Schulz-Knappe, R. Gerzer, J.-M. Heim, and W.-G. Forssmann, *FEBS Lett.*, **318**, 205 (1993). (*Circulating Form*)
4) O. Hill, M. Kuhn, H.-D. Zucht, Y. Cetin, H. Kulaksiz, K. Adermann, G. Klock, G. Rechkemmer, W.-G. Forssmann, and H.-J. Maegert, *Proc. Natl. Acad. Sci. U.S.A.*, **92**, 2046 (1995). (*Immunohistochem.*)

Code	Compound			Price:Yen
4275-s -20℃	**Guanylin (Rat, Mouse)** Pro-Asn-Thr-Cys-Glu-Ile-Cys-Ala-Tyr-Ala-Ala-Cys-Thr-Gly-Cys (Disulfide bonds between Cys^4-Cys^{12} and Cys^7-Cys^{15}) (M.W. 1515.7) $C_{60}H_{90}N_{16}O_{22}S_4$ *Guanylate Cyclase C Activator*	Vial	0.1 mg	10,000

1) M.G. Currie, K.F. Fok, J. Kato, R.J. Moore, F.K. Hamra, K.L. Duffin, and C.E. Smith, *Proc. Natl. Acad. Sci. U.S.A.*, **89**, 947 (1992). (*Original; Rat*)
2) R.C. Wiegand, J. Kato, and M.G. Currie, *Biochem. Biophys. Res. Commun.*, **185**, 812 (1992). (*Original; Rat cDNA*)
3) S. Schults, T.D. Chrisman, and D.L. Garbers, *J. Biol. Chem.*, **267**, 16019 (1992). (*Tissue Distribution*)
4) F.J. de Sauvage, S. Keshav, W.-J. Kuang, N. Gillett, W. Henzel, and D.V. Goeddel, *Proc. Natl. Acad. Sci. U.S.A.*, **89**, 9089 (1992). (*Original; Mouse cDNA*)

Code	Compound			Price:Yen
4354-s -20℃	**Uroguanylin (Rat)** Thr-Asp-Glu-Cys-Glu-Leu-Cys-Ile-Asn-Val-Ala-Cys-Thr-Gly-Cys (Disulfide bonds between Cys^4-Cys^{12} and Cys^7-Cys^{15}) (M.W. 1569.8) $C_{60}H_{96}N_{16}O_{25}S_4$ *Guanylate Cyclase C Activator / Natriuretic Factor*	Vial	0.1 mg	10,000

1) M. Nakazato, H. Yamaguchi, Y. Date, M. Miyazato, K. Kangawa, M.F. Goy, N. Chino, and S. Matsukura, *Endocrinology*, **139**, 5247 (1998). (*Original*)
2) H. Ieda, S. Naruse, M. Kitagawa, H. Ishiguro, and T. Hayakawa, *Regul. Pept.*, **79**, 165 (1999). (*Pharmacol.*)
3) H. Fukae, H. Kinoshita, S. Fujimoto, T. Kita, M. Nakazato, and T. Eto, *Nephron*, **92**, 373 (2002). (*Pharmacol.; Natriuretic Activity*)
4) M. Kikuchi, S. Fujimoto, H. Fukae, H. Kinoshita, T. Kita, M. Nakazato, and T. Eto, *J. Am. Soc. Nephrol.*, **16**, 392 (2005). (*Pharmacol.; Natriuretic Activity*)

Code	Compound			Price:Yen
4295-s -20℃	**Uroguanylin Isomer A (Human)** (Trifluoroacetate Form) 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}) (M.W. 1667.9) $C_{64}H_{102}N_{18}O_{26}S_4$ [154525-25-4] Purity Information: Qz See page IV (XVI)	Vial	0.1 mg	9,000

Guanylate Cyclase C Activator

1) 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*)
2) M. Nakazato, H. Yamaguchi, H. Kinoshita, K. Kangawa, H. Matsuo, N. Chino, and S. Matsukura, *Biochem. Biophys. Res. Commun.*, **220**, 586 (1996). (*GC-C Stimulating Activity of Topological Isomers*)
3) H. Kinoshita, S. Fujimoto, M. Nakazato, N. Yokota, Y. Date, H. Yamaguchi, S. Hisanaga, and T. Eto , *Kidney Int.*, **52**, 1028 (1997). (*Urine/Plasma Level; Renal Disease*)
4) N. Chino, S. Kubo, T. Kitani, T. Yoshida, R. Tanabe, Y. Kobayashi, M. Nakazato, K. Kangawa, and T. Kimura, *FEBS Lett.*, **421**, 27 (1998). (*Interconversion of Topological Isomers*)
5) 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). (*Natriuretic Activity of Topological Isomers*)

Code	Compound			Price:Yen
4463-s New -20℃	**Uroguanylin Isomer B (Human)** (Trifluoroacetate Form) 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}) (M.W. 1667.9) $C_{64}H_{102}N_{18}O_{26}S_4$ *Natriuretic Factor*	Vial	0.1 mg	9,000

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 resulting in the stabilization of 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 is, **isomer B** possesses natriuretic activity[4] with a sigmoidal dose-response curve (ED_{50} = 20 nmol/kg in rats). 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 ℃) should help avoid this possible interconversion.

1) L.R. Forte, *J. Clin. Invest.*, **112**. 1138 (2003). (*Review: Natriuretic Factor*)
2) 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*)
3) M. Nakazato, H. Yamaguchi, H. Kinoshita, K. Kangawa, H. Matsuo, N. Chino, and S. Matsukura, *Biochem. Biophys. Res. Commun.*, **220**, 586 (1996). (*GC-C Stimulating Activity of Topological Isomers*)
4) 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). (*Natriuretic Activity of Topological Isomers*)
5) S.L. Carrithers, C.E. Ott, M.J. Hill, B.R. Johnson, W. Cai, J.J. Chang, R.G. Shah, C. Sun, E.A. Mann, M.C. Fonteles, L.R. Forte, B.A. Jackson, R.A. Giannella, and R.N. Greenberg, *Kidney Int.*, **65**, 40 (2004). (*GC-C-Independent Natriuretic Activity*)
6) N. Chino, S. Kubo, T. Kitani, T. Yoshida, R. Tanabe, Y. Kobayashi, M. Nakazato, K. Kangawa, and T. Kimura, *FEBS Lett.*, **421**, 27 (1998). (*Interconversion of Topological Isomers*)

Hepcidins

Code	Compound			Price:Yen
4392-s -20℃	**Hepcidin / LEAP-1 (Human)** **Liver-Expressed Antimicrobial Peptide 1 (Human)** 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 (Reported disulfide bonds between Cys^{7}-Cys^{23}, Cys^{10}-Cys^{13}, Cys^{11}-Cys^{19}, and Cys^{14}-Cys^{22}) (M.W. 2789.4) $C_{113}H_{170}N_{34}O_{31}S_9$ [342790-21-0] *Iron-Regulatory Hormone / Liver-Specific Antimicrobial Peptide*	Vial	0.1 mg	18,000

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[4]. 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. Gastrointest. Liver 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*)

- **Note about the Description of Disulfide Bondage**: In this catalog we use three descriptions, from **i)** to **iii)**, to show the disulfide connectivity of our items.
  i) (Disulfide bond(s) between .....) = disulfide connectivity of our synthetic peptide is ascertained by ourselves.
  ii) (Reported disulfide bonds between .....) = disulfide connectivity of our synthetic peptides has not yet been determined by us and consequently, the disulfide connectivity in reported literature is shown after confirming the biological activity and/or chromatographic behavior of our synthetic products to be identical to those of the natural peptides.
  iii) (Disulfide bonds undetermined) = as far as we know, disulfide connectivity of the titled peptide has not yet been reported in the literature.

Hepcidins (continued)

Code	Compound			Price:Yen
4434-s -20℃	**Hepcidin 1 (Mouse)** 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*	Vial	0.1 mg	22,000

Liver-expressed antimicrobial peptide 1 (LEAP-1), isolated from the ultrafiltrate of human plasma, was first reported in 2000[1]. The same peptide with another name, hepcidin[2], appeared in 2001 soon after LEAP-1 had been reported, which was followed by the discovery of **mouse hepcidin**[3]. In mouse, two hepcidins, **hepcidin 1** and 2, were identified, where the amino acid sequence homology of **hepcidin 1** to human hepcidin/LEAP-1 (Code 4392-s) is higher than that of hepcidin 2[3,4]. Human LEAP-2 (Code 4405-s) was also reported as the second component of the LEAP peptide[5], in which both primary structure and the number of disulfide bonds in the molecule differ significantly from those of human hepcidin/LEAP-1, as well as hepcidin 1 and 2 in mouse.

Hepcidin/LEAP-1 was found to be a member of antimicrobial peptides when human peptide was isolated[1,2]. In contrast to this, **mouse hepcidin** (**hepcidin 1**) was discovered from the search of the gene that is up-regulated in the liver under the iron overloaded conditions[3]. Now, it is generally accepted that hepcidin is linked to the iron homeostasis in the body. Ferroportin, an iron exporter on the cell surface, was revealed to have an iron releasing function from the store (thus it is suggested to be a plausible receptor for hepcidin)[6]. Taken together, hepcidin is considered to be an iron regulatory hormone[7]. Secretion of hepcidin/LEAP-1 is modulated by inflammation as well as iron status in the body[8], indicating that the hepcidin/LEAP-1 peptides clearly possess at least two distinct functions essential for the life of the humans.

We introduced synthetic **Hepcidin 1 (Mouse)** as one of our items, by which the research for investing the mechanism of the function of the hepcidin/LEAP-1 peptides, especially the role of these peptides in the iron-related disease should be stimulated.

1) A. Krause, S. Neitz, H.-J. Mäert, 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) C. Pigeon, G. Ilyin, B. Courselaud, P. Leroyer, B. Turlin, P. Brissot, and O. Loréal, *J. Biol. Chem.*, **276**, 7811 (2001). (*Original; Mouse Hepcidin 1 & 2 / Fe Regulatory Hormone*)
4) G. Ilyin, B. Courselaud, M.-B. Troadec, C. Pigeon, M. Alizadeh, P. Leroyer, P. Brissot, and O. Loréal, *FEBS Lett.*, **542**, 22 (2003). (*Original; Mouse Hepcidin 1 & 2*)
5) A. Krause, R. Sillard, B. Kleemeier, E. Klüer, E. Maronde, J.R. Conejo-García, W.G. Forssmann, P. Schulz-Knappe, M.C. Nehls, F. Wattler, S. Wattler, and K. Adermann, *Protein Sci.*, **12**, 143 (2003). (*Original; LEAP-2*)
6) E. Nemeth, M.S. Tuttle, J. Powelson, M.B. Vaughn, A. Donovan, D. McVey Ward, T. Ganz, and J. Kaplan, *Science*, **306**, 2090 (2004). (*Ferroportin; Hepcidin Receptor*)
7) T. Ganz and E. Nemeth, *Am. J. Physiol. Gastrointest. Liver Physiol.*, **290**, G199 (2006). (*Review; Hepcidin*)
8) G. Nicolas, C. Chauvet, L. Viatte, J.L. Danan, X. Bigard, I. Devaux, C. Beaumont, A. Kahn, and S. Vaulont, *J. Clin. Invest.*, **110**, 1037 (2002). (*Pharmacol.; Regulation of Hepcidin mRNA*)

Histatin

Code	Compound			Price:Yen
4270-s -20℃	**Histatin 5 (Human)** Asp-Ser-His-Ala-Lys-Arg-His-His-Gly-Tyr-Lys-Arg-Lys-Phe-His-Glu-Lys-His-His-Ser-His-Arg-Gly-Tyr (M.W. 3036.3) $C_{133}H_{195}N_{51}O_{33}$ [104339-66-4] *Parotid Histidine–rich Protein / Salivary Antimicrobial Peptide*	Vial	0.1 mg	14,000

1) F.G. Oppenheim, T. Xu, F.M. McMillian, S. M.Levitz, R.D. Diamond, G.D. Offner, and R.F. Troxler, *J. Biol. Chem.*, **263**, 7472 (1988). (*Original*)
2) P.A. Raj, M. Edgerton, and M.J. Levine, *J. Biol. Chem.*, **265**, 3898 (1990). (*Pharmacol.*)
3) Y. Murakami, T. Takeshita, S. Shizukuishi, A. Tsunemitsu, and S. Aimoto, *Arch. Oral Biol.*, **35**, 775 (1990). (*Pharmacol.*)
4) M. Nishikata, T. Kanehira, H. Oh, H. Tani, M. Tazaki, and Y. Kuboki, *Biochem. Biophys. Res. Commun.*, **174**, 625 (1991). (*Pharmacol.*)

hBD-1 See Code 4337 **β-Defensin-1 (Human)** on page 51

hBD-2 See Code 4338 **β-Defensin-2 (Human)** on page 51

hBD-3 See Code 4382 **β-Defensin-3 (Human)** on page 52

hBD-4 See Code 4406 **β-Defensin-4 (Human)** on page 53

HD-5 See Code 4415 **α-Defensin-5 (Human)** on page 49

HD-6 See Code 4458 **α-Defensin-6 (Human)** on page 50

hL8C See Code 4403 **Neuropeptide W-30 (Human)** on page 109

HNP-1 See Code 4271 **α-Defensin-1 (Human)** on page 46

HNP-2 See Code 4428 **α-Defensin-2 (Human)** on page 46

HNP-3 See Code 4416 **α-Defensin-3 (Human)** on page 47

HNP-4 See Code 4431 **α-Defensin-4 (Human)** on page 48

1) I. Nishimoto, M. Matsuoka, and T. Niikura, *Trends Mol. Med.*, **10**, 102 (2004). (*Review*)
2) T. Arakawa, Y. Kita, and T. Niikura, *Curr. Med. Chem.*, **15**, 2086 (2008). (*Review*)

Code	Compound			Price:Yen
4384-v -20℃	**Humanin** (Trifluoroacetate Form) Met-Ala-Pro-Arg-Gly-Phe-Ser-Cys-Leu-Leu-Leu-Leu-Thr-Ser-Glu-Ile-Asp-Leu-Pro-Val-Lys-Arg-Arg-Ala (M.W. 2687.2) $C_{119}H_{204}N_{34}O_{32}S_2$ [330936-69-1] Purity Information: Qz See page IV (XVI) *Endogenous Rescue Factor Abolishing Neuronal Cell Death*	Vial	0.5 mg	25,000
4385-v -20℃	**[Gly^{14}]-Humanin** (Trifluoroacetate Form) Met-Ala-Pro-Arg-Gly-Phe-Ser-Cys-Leu-Leu-Leu-Leu-Thr-Gly-Glu-Ile-Asp-Leu-Pro-Val-Lys-Arg-Arg-Ala (M.W. 2657.2) $C_{118}H_{202}N_{34}O_{31}S_2$ [330936-70-4] Purity Information: Qz See page IV (XVI) *Potent Rescue Factor Abolishing Neuronal Cell Death*	Vial	0.5 mg	10,000

1) Y. Hashimoto, T. Niikura, H. Tajima, T. Yasukawa, H. Sudo, Y. Ito, Y. Kita, M. Kawasumi, K. Kouyama, M. Doyu, G. Sobue, T. Koide, S. Tsuji, J. Lang, K. Kurokawa, and I. Nishimoto, *Proc. Natl. Acad. Sci. U.S.A.*, **98**, 6336 (2001). (*Original*)
2) Y. Hashimoto, Y. Ito, T. Niikura, Z. Shao, M. Hata, F. Oyama, and I. Nishimoto, *Biochem. Biophys. Res. Commun.*, **283**, 460 (2001). (*Pharmacol.*)
3) T. Mamiya and M. Ukai, *Br. J. Pharmacol.*, **134**, 1597 (2001). (*Pharmacol.*)
4) S. Kariya, N. Takahashi, N. Ooba, M. Kawahara, H. Nakayama, and S. Ueno, *Neurochemistry*, **13**, 903 (2002). (*Pharmacol.*)
5) S.S. Jung and W.E. Van Nostrand, *J. Neurochem.*, **84**, 266 (2003). (*Pharmacol.*)

IAPP See Code 4219 **Amylin (Human)** and Code 4220 **Amylin (Rat)** on page 10

Huwentoxin

Code	Compound			Price:Yen
4455-s New -20℃	**Huwentoxin-IV** **HWTX-IV** **(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. 4106.8) $C_{174}H_{278}N_{52}O_{51}S_6$ Purity Information : QE See page IV (XVI)	Vial	0.1 mg	22,000

Neuronal Tetrodotoxin-Sensitive Na^+Channel Blocker

Huwentoxin-IV was isolated from the venom of the Chinese bird spider *Ornithoctonus huwena*. Its structure was elucidated to be a 35-residue peptide with three disulfide linkages which are arranged to form the inhibitor cystine knot[1,2]. **Huwentoxin-IV** is a potent inhibitor of neuronal tetrodotoxin-sensitive Na^+ channels with IC_{50} = 30 nM[1]. Further studies clarified that **i)** among neuronal voltage-gated Na^+ channels, human Nav1.7 is most sensitive to **huwentoxin-IV** where site 4 of the channel is the interacting site (IC_{50} = 26 nM)[3], and **ii)** **huwentoxin-IV** interacts with central Na^+ channel isoforms from rat hippocampus neurons, while the affinity is low (IC_{50} = ～ 0.4 μM)[4]. Interestingly, **huwentoxin-IV** fails to partition into the artificial membrane bilayers, indicating that the mechanism for blocking Na^+ channels by **huwentoxin-IV** is distinct from that of ProTx-II (Code 4450-s), another Na^+ channel blocker isolated from the tarantula[4].

Our list of Na^+ channel blocker (see page on 42) may facilitate the research of antinociceptive drug discovery.

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

Iberiotoxin

Code	Compound			Price:Yen
4235-s -20℃	**Iberiotoxin*** **IbTX** **(Scorpion, *Buthus tamulus*)** Pyr-Phe-Thr-Asp-Val-Asp-Cys-Ser-Val-Ser- Lys-Glu-Cys-Trp-Ser-Val-Cys-Lys-Asp-Leu- Phe-Gly-Val-Asp-Arg-Gly-Lys-Cys-Met-Gly- Lys-Lys-Cys-Arg-Cys-Tyr-Gln (Disulfide bonds between Cys^7-Cys^{28}, Cys^{13}-Cys^{33}, and Cys^{17}-Cys^{35}) (M.W. 4230.8) $C_{179}H_{274}N_{50}O_{55}S_7$ [129203-60-7]	Vial	0.1 mg	23,000

Ca^{2+}-Activated K^+ Channel Blocker (Maxi-K^+ Channel Blocker)

1) A. Galvez, G. Gimenez-Gallego, J.P. Reuben, L. Roy-Contancin, P. Feigenbaum, G.J. Kaczorowski, and M.L. Garcia, *J. Biol. Chem.*, **265**, 11083 (1990). (*Original*)
2) M.L. Garcia, A. Galvez, M. Garcia-Calvo, V.F. King, J. Vazquez, and G. J. Kaczorowski, *J. Bioenerg. Biomembr.*, **23**, 615 (1991). (*Review*)
3) K.M. Giangiacomo, M.L. Garcia, and O.B. McManus, *Biochemistry*, **31**, 6719 (1992). (*Pharmacol.*)
4) G. J. Kaczorowski, H.-G. Kaus, R.J. Leonard, O.B. McManus, and M.L. Garcia, *J. Bioenerg. Biomembr.*, **28**, 255 (1996). (*Review*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Imperatoxin

Code	Compound			Price:Yen
4343-s -20℃	**Imperatoxin A** **IpTXa** **(Scorpion, *Pandinus imperator*)** Gly-Asp-Cys-Leu-Pro-His-Leu-Lys-Arg-Cys-Lys-Ala-Asp-Asn-Asp-Cys-Cys-Gly-Lys-Lys-Cys-Lys-Arg-Arg-Gly-Thr-Asn-Ala-Glu-Lys-Arg-Cys-Arg (Reported disulfide bonds between Cys^{3}-Cys^{17}, Cys^{10}-Cys^{21}, and Cys^{16}-Cys^{32}) (M.W. 3758.4) $C_{148}H_{254}N_{58}O_{45}S_6$ [172451-37-5] Purity: higher than 94% by HPLC	Vial	0.1 mg	22,000

Activator of Ca^{2+} Release Channels / Ryanodine Receptors

1) H.H. Valdivia, M.S. Kirby, W.J. Lederer, and R.Coronado, *Proc. Natl. Acad. Sci. U.S.A.*, **89**, 12185 (1992). (*Pharmacol.*)
2) R. El-Hayek, A.J. Lokuta, C. Arévalo, and H.H. Valdivia, *J. Biol. Chem.*, **270**, 28696 (1995). (*Pharmacol.*)
3) F.Z. Zamudio, G.B. Gurrola, C. Arévalo, R. Sreekumar, J.W. Walker, H.H. Valdivia, and L.D. Possani, *FEBS Lett.*, **405**, 385 (1997). (*Original; Structure*)
4) K. Takeuchi, J.I. Kim, H. Takahashi, K. Sato, and I. Shimada, *Peptide Science 1999*, 307 (2000). (*S-S Bond*)

Insulin

1) E. Dorzbach (ed.), Insulin I, *Handbook of Experimental Pharmacology*, **Vol. 32 (1)**, Springer-Verlag, Berlin, 1971. (*Review*)
2) A. Hasselblatt and F.V. Bruchhausen (eds.), Insulin II, *Handbook of Experimental Pharmacology*, **Vol. 32 (2)**, Springer-Verlag, Berlin, 1975. (*Review*)

Code	Compound			Price:Yen
4088-s -20℃	**Insulin (Human)** Enzymatically Derived from Porcine Insulin A-chain: Gly-Ile-Val-Glu-Gln-Cys-Cys-Thr-Ser-Ile-Cys-Ser-Leu-Tyr-Gln-Leu-Glu-Asn-Tyr-Cys-Asn B-chain: Phe-Val-Asn-Gln-His-Leu-Cys-Gly-Ser-His-Leu-Val-Glu-Ala-Leu-Tyr-Leu-Val-Cys-Gly-Glu-Arg-Gly-Phe-Phe-Tyr-Thr-Pro-Lys-Thr (Disulfide bonds between Cys^{A6}-Cys^{A11}, Cys^{A7}-Cys^{B7}, and Cys^{A20}-Cys^{B19}) (M.W. 5807.6) $C_{257}H_{383}N_{65}O_{77}S_6$ [11061-68-0]	Vial	0.1 mg	13,000
4088-v -20℃	**Insulin (Human)** Enzymatically Derived from Porcine Insulin Purity Information : QE See page IV (XVI)	Vial	0.5 mg	44,000

1) K. Morihara, T. Oka, and H. Tsuzuki, *Nature*, **280**, 412 (1979). (*Semi-Synthesis*)
2) K. Morihara, T. Oka, H. Tsuzuki, Y. Tochino, and T. Kanaya, *Biochem. Biophys. Res. Commun.*, **92**, 396 (1980). (*Semi-Synthesis*)

Intermedin (Human) See Code 4421 **Adrenomedullin 2 / Intermedin (Human)** on page 4

Intermedin (Rat) See Code 4422 **Adrenomedullin 2 / Intermedin (Rat)** on page 4

IpTXa See Code 4343 **Imperatoxin A** above

IRL 1620 See Code 4285 **Suc-[Glu^{9}, $Ala^{11,15}$]-Endothelin-1 (8-21)** on page 62

Joining Peptide

Code	Compound			Price:Yen
4288-v -20℃	**Joining Peptide (Rat)** Ala-Glu-Glu-Glu-Thr-Ala-Gly-Gly-Asp-Gly- Arg-Pro-Glu-Pro-Ser-Pro-Arg-Glu-NH_2 (M.W. 1882.9) $C_{75}H_{119}N_{25}O_{32}$	Vial	0.5 mg	20,000

Pivotal Neuropeptide in Cardiovascular Regulation

1) T. Hamakubo, M. Yoshida, K. Nakajima, T.X. Watanabe, R. Mosqueda-Garcia, and T. Inagami, *Am. J. Physiol.*, **265**, R1184 (1993). (*Original*)
2) M. Yoshida, T. Hamakubo, and T. Inagami, *Am. J. Physiol.*, **266**, R802 (1994). (*Pharmacol.*)

Kallidin See Code 4008 **Lysyl-Bradykinin** on page 28

Kaliotoxin

Code	Compound			Price:Yen
4259-s -20℃	**Kaliotoxin (1-37)*** **(Scorpion, *Androctonus mauretanicus mauretanicus*)** Gly-Val-Glu-Ile-Asn-Val-Lys-Cys-Ser-Gly- Ser-Pro-Gln-Cys-Leu-Lys-Pro-Cys-Lys-Asp- Ala-Gly-Met-Arg-Phe-Gly-Lys-Cys-Met-Asn- Arg-Lys-Cys-His-Cys-Thr-Pro (Reported disulfide bonds between Cys^{8}-Cys^{28}, Cys^{14}-Cys^{33}, and Cys^{18}-Cys^{35}) (M.W. 4021.8) $C_{165}H_{271}N_{53}O_{48}S_8$	Vial	0.1 mg	22,000

High Conductance Ca^{2+}-Activated K^+ Channel Blocker

1) M. Crest, G. Jacquet, M. Gola, H. Zerrouk, A. Benslimane, H. Rochat, P. Mansuelle, and M.-F. Martin-Eauclaire, *J. Biol. Chem.*, **267**, 1640 (1992). (*Original*)
2) R. Romi, M. Crest, M. Gola, F. Sampieri, G. Jacquet, H. Zerrouk, P. Mansuelle, O. Sorokine, A.V. Dorsselaer, H. Rochat, M.-F. Martin-Eauclaire, and J.V. Rietschoten, *J. Biol. Chem.*, **268**, 26302 (1993). (*Chem. Synthesis & Pharmacol.*)
3) F.R. Romi, S. Szendeffy, M.F. Martin-Eauclaire, H. Rochat, J.V. Rietschoten, M. Pons, and E. Giralt, *Biochemistry*, **33**, 14256 (1994). (*Unique Structure*)
4) A.L. Harvey, H. Vatanpour, E.G. Rowan, S. Pinkasfeld, C. Vita, A. Menez, and M.-F. Martin-Eauclaire, *Toxicon*, **33**, 425 (1995). (*Pharmacol.*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

List of Kisspeptin / Metastin and Related Peptide

	Code	Compound	Quantity	Price: Yen	Page
New	4446-s	**Kisspeptin-54 (Human) / Metastin (Human, 1-54)**	0.1 mg vial	22,000	87
New	4447-s	**Kisspeptin-52 (Rat) / Metastin (Rat, 1-52)**	0.1 mg vial	28,000	87
	4389-v	**Kisspeptin-10 (Human) / Metastin (Human, 45-54)**	0.5 mg vial	7,200	below
New	4453-v	**Kisspeptin-10 (Rat) / Metastin (Rat, 43-52)**	0.5 mg vial	7,200	88
New	4460-v	**Peptide 234** (antagonist)	0.5 mg vial	7,200	122

Code	Compound			Price:Yen
4389-v	**Kisspeptin-10 (Human) / Metastin (Human, 45-54)**	Vial	0.5 mg	7,200

-20℃

Kp-10 (Human) / *KiSS-1* Gene Product (Human, 112-121 Amide)

Tyr-Asn-Trp-Asn-Ser-Phe-Gly-Leu-Arg-Phe-NH_2

(M.W. 1302.4) $C_{63}H_{83}N_{17}O_{14}$ [374675-21-5]

Ligand for OT7T175 / GPR54

1) 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*)
2) 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, P. Emson, R. Faull, K.L. Philpott, and D.C. Harrison, *J. Biol. Chem.*, **276**, 28969 (2001). (*Original; Peptide Kiss–1*)
3) 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). (*Original; Kisspeptin*)
4) A. Hori, S. Honda, M. Asada, T. Ohtaki, K. Oda, T. Watanabe, Y. Shintani, T. Yamada, M. Suenaga, C. Kitada, H. Onda, T. Kurokawa, O. Nishimura, and M. Fujino, *Biochem. Biophys. Res. Commun.*, **286**, 958 (2001). (*Pharmacol.*)
5) 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.*)
6) S. Ramaswamy, S.B. Seminara, C.R. Pohl, M.J. DiPietro, W.F. Crowley, Jr. and T.M. Plant, *Endocrinology*, **148**, 3364 (2007). (*Pharmacol.*)
7) S.B. Seminara and U.B. Kaiser, *Endocrinology*, **146**, 1686 (2005). (*Minireview*)
8) K.I. Maeda, S. Adachi, K. Inoue, S. Ohkura, and H. Tsukamura, *Rev. Endocrinol. Metab. Disord.*, **8**, 21 (2007). (*Review*)

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Kisspeptins / Metastins (continued)

Code	Compound			Price:Yen
4446-s New -20℃	**Kisspeptin-54 (Human) / Metastin (Human, 1-54)** **Kp-54 (Human) / *KiSS-1* Gene Product (Human, 68-121 Amide)** 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. 5857.4) $C_{258}H_{401}N_{79}O_{78}$ *Stimulator of Hypothalamic-Pituitary Gonadal Axis*	Vial	0.1 mg	22,000
4447-s New -20℃	**Kisspeptin-52 (Rat) / Metastin (Rat, 1-52)** **Kp-52 (Rat) / *KiSS-1* Gene Product (Rat, 68-119 Amide)** 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. 5836.6) $C_{254}H_{398}N_{80}O_{73}S_3$ *Stimulator of Hypothalamic-Pituitary Gonadal Axis*	Vial	0.1 mg	28,000

Kisspeptin-54 (Human) / Metastin (Human, 1-54) and **Kisspeptin-52 (Rat) / Metastin (Rat, 1-52)** are the peptides encoded by the *Kiss-1* gene[1,2,3,4]. These peptides are ligands for GPR54 (also known as hOT7T175 and AXOR12), the nomenclature of which was recommended recently to be KISS1R (for human receptors) and Kiss1r (for non-human receptors)[4]. Since their discovery, several research reports suggest that **kisspeptin / metastin** functions in a regulatory capacity in reproductive systems through action on the hypothalamic-pituitary-gonadal axis[5,6].

It has been also clarified that the carboxyl-terminal 10-residue peptides of human and rat **kisspeptin / metastin** are the active center of the corresponding mature intact peptide; therefore, they are now recognized as a useful reagent in the study of reproductive systems (Code 4389 and 4453 for human and rat peptide, respectively). However, there are some reports presenting differences in efficacy and characteristics of the activity between the 10-residue peptide and the mature intact 54- and 52-amino acid residue peptides[7,8,9,10].

We have now successfully synthesized **Kisspeptin-54 (Human) / Metastin (Human, 1-54)** and **Kisspeptin-52 (Rat) / Metastin (Rat, 1-52)** and started to distribute them as our new catalog items. These peptides may contribute to the progress in the study of reproductive systems. We hope that precise research will be possible using the longer mature peptides together with the shorter 10-residue peptides of both human and rat origins.

1) 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; Human Metastin*)
2) 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, P. Emson, R. Faull, K.L. Philpott, and D.C. Harrison, *J. Biol. Chem.*, **276**, 28969 (2001). (*Original; Human Kisspeptin*)
3) Y. Terao, S. Kumano, Y. Takatsu, M. Hattori, A. Nishimura, T. Ohtaki, and Y. Shintani, *Biochim. Biophys. Acta*, **1678**, 102 (2004). (*Original; Rat Metastin*)
4) M.L. Gottsch, D.K. Clifton, and R.A. Steiner, *Peptides*, **30**, 4 (2009). (*Review; Recommendation in Nomenclature*)
5) C.N. Jayasena and W.S. Dhillo, *Curr. Opin. Investig. Drugs*, **10**, 311 (2009). (*Review*)
6) W.H. Colledge, *Trends Endocrinol. Metab.*, **20**, 115 (2009). (*Review*)
7) E.L. Thompson, K.G. Murphy, M. Patterson, G.A. Bewick, G.W.H. Stamp, A.E. Curtis, J.H. Cooke, P.H. Jethwa, J.F. Todd, M.A. Ghatei, and S.R. Bloom, *Am. J. Physiol. Endocrinol. Metab.*, **291**, 1074 (2006). (*Pharmacol.*)
8) S. Tovar, M.J. Vázquez, V.M. Navarro, R. Fernández-Fernández, J.M. Castellano, E. Vigo, J. Roa, F.F. Casamueva, E. Aguilar, L. Pinilla, C. Dieguez, and M. Tena-Sempere, *Endocrinology*, **147**, 2696 (2006). (*Pharmacol.*)
9) W.S. Dhillo, O.B. Chaudhri, E.L. Tnompson, K.G. Murphy, M. Patterson, R. Ramachandran, G.K. Nijher, V. Amber, A. Kokkinos, M. Donaldson, M.A. Ghatei, and S.R. Bloom, *J. Clin. Endocrinol. Metab.*, **92**, 3958 (2007). (*Phalmacol.*)
10) 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.*)

Kisspeptins / Metastins

Code	Compound			Price:Yen
4453-v New -20℃	**Kisspeptin-10 (Rat) / Metastin (Rat, 43-52)** **Kp-10 (Rat) / *KiSS-1* Gene Product (Rat, 110-119 Amide)** 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 OT7T175 / GPR54*	Vial	0.5 mg	7,200

Metastasis suppressor gene *KiSS-1* encodes a peptide with multiple biological functions such as inhibition of cancer metastasis, vasoconstriction, reproduction, and so on. In human and rat, the encoded mature peptide is composed of 54 and 52 amino acid residues, respectively, which is named metastin or kisspeptin[1,2,3]. Kisspeptin-10 (Human) / Metastin (Human, 45-54) is an active segment of the human peptide from the C-terminal portion and is already available from our catalog (Code 4389-v).

Very recently, in collaboration with Dr. Tsukamura and her colleagues in Nagoya University, we have successfully clarified that the corresponding rat 10-residue peptide, **Kisspeptin-10 (Rat) / Metastin (Rat, 43-52)**, exerts the luteinizing hormone (LH) releasing activity in male rats[4]. Actually, intracerebroventricular or intravenously administration at a dose of 1 nmol/kg or 10 nmol/kg stimulates LH release and significantly increases plasma LH level in male rats.

Now the precise experiment using **Kisspeptin-10 (Rat) / Metastin (Rat, 43-52)** is possible in rat studies.

1) 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*)
2) 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*)
3) Y. Terao, S. Kumano, Y. Takatsu, M. Hattori, A. Nishimura, T. Ohtaki, and Y. Shintani, *Biochim. Biophys. Acta*, **1678**, 102 (2004). (*Original; Rat Metastin*)
4) 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.*)
5) M.L. Gottsch, D.K. Clifton, and R.A. Steiner, *Peptides*, **30**, 4 (2009). (*Review; Recommendation in Nomenclature*)

Kurtoxin

Code	Compound			Price:Yen
4375-s -20℃	**Kurtoxin** **(Scorpion, *Parabuthus transvaalicus*)** Lys-Ile-Asp-Gly-Tyr-Pro-Val-Asp-Tyr-Trp- Asn-Cys-Lys-Arg-Ile-Cys-Trp-Tyr-Asn-Asn- Lys-Tyr-Cys-Asn-Asp-Leu-Cys-Lys-Gly-Leu- Lys-Ala-Asp-Ser-Gly-Tyr-Cys-Trp-Gly-Trp- Thr-Leu-Ser-Cys-Tyr-Cys-Gln-Gly-Leu-Pro- Asp-Asn-Ala-Arg-Ile-Lys-Arg-Ser-Gly-Arg- Cys-Arg-Ala (Disulfide bonds between Cys^{12}-Cys^{61}, Cys^{16}-Cys^{37}, Cys^{23}-Cys^{44}, and Cys^{27}-Cys^{46}) (M.W. 7386.4) $C_{324}H_{478}N_{94}O_{90}S_8$ Purity Information: Qp See page IV (XVI) *T-type Ca^{2+} Channel Blocker*		0.1 mg	30,000

1) R.S-I. Chuang, H. Jaffe, L. Cribbs, E. Perez-Reyes, and K.J. Swartz, *Nat. Neurosci.*, **1**, 668 (1998). (*Original*)
2) S.S. Sidach and I.M. Mintz, *J. Neurosci.*, **22**, 2023 (2002). (*Pharmacol; Specificity for Ca^{2+} Channel Blocking Activity*)
3) T. Olamendi-Portugal, B.I. García, I. López-González, J. Van Der Walt, K. Dyason, C. Ulens, J. Tytgat, R. Felix, A. Darszon, and L.D. Possani, *Biochem. Biophys. Res. Commun.*, **299**, 562 (2002). (*Pharmacol.*)
4) I. López-González, T. Olamendi-Portugal, J.L. De La Vega-Beltrán, J. Van der Walt, K. Dyason, L.D. Possani, R. Felix, and A. Darszon, *Biochem. Biophys. Res. Commun.*, **300**, 408 (2003). (*Pharmacol.*)
5) H. Nishio, Y. Nishiuchi, M. Ishimaru, and T. Kimura, *Lett. Pept. Sci.*, **10**, 589 (2003). (*Chem. Synthesis & S-S Bond*)

Laminin

Code	Compound			Price:Yen
4194-v -20℃	**Laminin Pentapeptide YIGSR-NH_2** Tyr-Ile-Gly-Ser-Arg-NH_2 (M.W. 593.68) $C_{26}H_{43}N_9O_7$ [110590-65-3]	Vial	0.5 mg	3,000
4194 -20℃	**Laminin Pentapeptide YIGSR-NH_2** Tyr-Ile-Gly-Ser-Arg-NH_2 • 2AcOH • $2H_2O$ (M.W. 593.68 • 120.10 • 36.03) $C_{26}H_{43}N_9O_7$ • $2CH_3COOH$ • $2H_2O$ 1) Y. Iwamoto, F.A. Robey, J. Graf, M. Sasaki, H.K. Kleinman, Y. Yamada, and G.R. Martin, *Science*, **238**, 1132 (1987). (*Original*)	Bulk	25 mg 100 mg	23,000 65,000

LEAP-1 See Code 4392 **Hepcidin / LEAP-1 (Human)** on page 79

LEAP-2 See Code 4405 **Liver-Expressed Antimicrobial Peptide 2 (Human)** on page 90

Leiurotoxin I See Code 4260 **Scyllatoxin** on page 139

Leu-Pro-Leu-Arg-Phe-NH_2

4144 -20℃	**Leu-Pro-Leu-Arg-Phe-NH_2** • 2AcOH • $2H_2O$* (M.W. 643.82 • 120.10 • 36.03) $C_{32}H_{53}N_9O_5$ • $2CH_3COOH$ • $2H_2O$ *Chicken Brain Peptide* 1) G.J. Dockray, J.R. Reeve, Jr., J. Shively, R.J. Gayton, and C.S. Barnard, *Nature*, **305**, 328 (1983). (*Original*)	Bulk	25 mg 100 mg	25,000 69,000

β-Lipotropin (61-76) See Code 4055 **α-Endorphin** on page 58

β-Lipotropin (61-77) See Code 4089 **γ-Endorphin** on page 58

β-Lipotropin (Human, 61-91) See Code 4060 **β-Endorphin (Human)** on page 58

Liver-Cell Growth Factor

4022 -20℃	**Liver-Cell Growth Factor** Gly-His-Lys • AcOH • H_2O (M.W. 340.38 • 60.05 • 18.02) $C_{14}H_{24}N_6O_4$ • CH_3COOH • H_2O [72957-37-0] 1) L. Pickart, L. Thayer, and M.M. Thaler, *Biochem. Biophys. Res. Commun.*, **54**, 562 (1973). (*Original*)	Bulk	25 mg 100 mg	7,500 15,400

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Liver-Expressed Antimicrobial Peptide (LEAP)

Code	Compound			Price:Yen
4405-s -20℃	**LEAP-2 (Human)** **Liver-Expressed Antimicrobial Peptide 2 (Human)** **Prepro-LEAP-2 (Human, 38-77)** Met-Thr-Pro-Phe-Trp-Arg-Gly-Val-Ser-Leu-Arg-Pro-Ile-Gly-Ala-Ser-Cys-Arg-Asp-Asp-Ser-Glu-Cys-Ile-Thr-Arg-Leu-Cys-Arg-Lys-Arg-Arg-Cys-Ser-Leu-Ser-Val-Ala-Gln-Glu (Disulfide bonds between Cys^{17}-Cys^{28} and Cys^{23}-Cys^{33}) (M.W. 4581.3) $C_{191}H_{316}N_{64}O_{57}S_5$	Vial	0.1 mg	22,000

Antimicrobial Peptide

One method aimed at finding peptides and proteins is "the systematic analysis of polypeptides in human blood ultrafiltrate", which has proven to be successful. Liver-expressed antimicrobial peptide 1 (LEAP-1)/hepcidin is an example of such, which elicits antimicrobial activity as well as some functions in iron homeostasis. Following LEAP-1, a cationic peptide termed **LEAP-2** was discovered using the same method, the "peptide trapping" approach[1].

The isolated peptides have variable chain lengths with the deletion of the longest peptide, composed of 40 amino acid residues, at both the amino- and carboxyl-termini. Its disulfide arrangement was determined to be Cys1-Cys3 and Cys2-Cys4 (Cys numbering from the amino-terminus) by analyzing the molecular weight and sequence of the tryptic fragments. The cDNA cloning of **LEAP-2** reveals the precursor of **LEAP-2** to be a 77-residue peptide, in which the longest form corresponds to the residues between the positions of 38 and 77 in the precursor [**prepro-LEAP-2(38-77)**]. The primary structures of **LEAP-2** of rhesus monkey, cow, pig, mouse, and guinea pig were also determined, and found to be highly conserved among these species. **LEAP-2** mRNA is predominantly expressed in the liver and small intestine.

LEAP-2 [**prepro-LEAP-2 (38-77)**] exerts antimicrobial activities against Gram-positive bacteria, Gram-negative bacteria, and yeast (IC_{50} value was around 5 μM against *Saccharomyces cerevisiae*). Interestingly, the amino-terminally truncated form, **prepro-LEAP-2 (44-77)**, has not affected the viability of the germs tested. The 40-residue peptide, **LEAP-2**, was reported to be circulating in human blood. **LEAP-2** should prove to be valuable in studying its role in self-defence in humans, as well as its role as an antimicrobial peptide in the family of the well-established α-/β-defensins.

1) A. Krause, R. Sillard, B. Kleemeier, E. Klüver, E. Maronde, J.R. Conejo-García, W.G. Forssmann, P. Schulz-Knappe, M.C. Nehls, F. Wattler, S. Wattler, and K. Adermann, *Protein Sci.*, **12**, 143 (2003). (*Original & S-S Bond*)
2) A. Hocquellet, B. Odaert, C. Cabanne, A. Noubhani, W. Dieryck, G. Joucla, C. Le Senechal, M. Milenkov, S. Chaignepain, J.M. Schmitter, S. Claverol, X. Santarelli, E.J. Dufourc, M. Bonneu, B. Garbay, and P. Costaglioli, *Peptides*, **31**, 58 (2010). (*Review*)

Luteinizing Hormone Releasing Hormone (LH-RH)

Code	Compound			Price:Yen
4013-v -20℃	**LH-RH (Human)** **Luteinizing Hormone Releasing Hormone (Human)** **GnRH** (Gonadotropin-Releasing Hormone) (Human) **(Porcine, Rat)** Pyr-His-Trp-Ser-Tyr-Gly-Leu-Arg-Pro-Gly-NH_2 (M.W. 1182.3) $C_{55}H_{75}N_{17}O_{13}$ [33515-09-2]	Vial	0.5 mg	2,700
4013 -20℃	**LH-RH (Human)** **Luteinizing Hormone Releasing Hormone (Human)** **GnRH** (Gonadotropin-Releasing Hormone) (Human) **(Porcine, Rat)** Pyr-His-Trp-Ser-Tyr-Gly-Leu-Arg-Pro-Gly-NH_2 • 2AcOH • $4H_2O$ (M.W. 1182.3 • 120.10 • 72.06) $C_{55}H_{75}N_{17}O_{13}$ • $2CH_3COOH$ • $4H_2O$ [71447-49-9]	Bulk	25 mg 100 mg	36,000 95,000

1) H. Matsuo, Y. Baba, R.M.G. Nair, A. Arimura, and A.V. Schally, *Biochem. Biophys. Res. Commun.*, **43**, 1334 (1971). (*Original*)

Lys-Lys-Lys-Leu-Arg-Arg-Gln-Glu-Ala-Phe-Asp-Ala-Tyr See Code 4374 on page 196

Lysenin See Code 4802 on page 152

LL-37

Code	Compound			Price:Yen
4445-s -20℃	**LL-37 (Human)** 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 (M.W. 4493.3) $C_{205}H_{340}N_{60}O_{53}$ *Cathelicidin Antimicrobial Peptide*	Vial	0.1 mg	12,000

Antimicrobial peptides (often abbreviated as AMPs) play essential roles in self-defense systems. Defensins are potential protecting factors against microbial infection and members of AMPs in human: we have been manufacturing α-defensin-1 (Code 4271), -2 (Code 4428), -3 (Code 4416), -4 (Code 4431), -5 (Code 4415), and -6 (Code 4458), as well as β-defensin-1 (Code 4337), -2 (Code 4338), -3 (Code 4382), and -4 (Code 4406) as our catalog items. Another member of AMP in human is **LL-37**, the so-called cathelicidin AMP[1,2]. Cathelicidins are one family of multifunctional AMPs, characterized by conserved pro-peptide sequences that have been identified in several mammalian species. On the contrary to disulfide cross-linked defensins, **LL-37** is a linear, amphipathic peptide with α-helical structure.

LL-37 is reported to exert not only antimicrobial activity but also immunomodulatory activity[2,3]. Recent papers describe the involvement of **LL-37** in toll-like receptor (TLR) activation: **i)** vitamin D receptor-mediated induction of **LL-37** through TLR2/1L activation was observed in human monocyte[4] and **ii)** **LL-37** interacts to self-DNA in psoriasis, after which the complex formed triggers TLR9, resulting in the induction of interferon-α production[5]. In the latter special case, **LL-37** might be the pathogenic factor of psoriasis, one of the autoimmune diseases, although **LL-37**, together with β-defensin-2, is reported to be highly expressed in psoriasis to protect the infection with *Staphylococcus aureus*[6].

Thus, **LL-37** should be valuable in the research of human defense systems, especially to clarify the mechanism of innate immunity and **LL-37**'s role in autoimmunity and cancer[7].

1) G.H. Gudmundsson, B. Agerberth, J. Odeberg, T. Bergman, B. Olsson, and R. Salcedo, *Eur. J. Biochem.*, **238**, 325 (1996). (*Original*)
2) R. Bals and J.M. Wilson, *Cell. Mol. Life Sci.*, **60**, 711 (2003). (*Review*)
3) M. Zanetti, *J. Leukoc. Biol.*, **75**, 39 (2004). (*Review*)
4) P.T. Liu, S. Stenger, H. Li, L.Wenzel, B.H. Tan, S.R. Krutzik, M.T. Ochoa, J. Schauber, K. Wu, C. Meinken, D.L. Kamen, M. Wagner, R. Bals, A. Steinmeyer, U. Zügel, R.L. Gallo, D. Eisenberg, M. Hewison, B.W. Hollis, J.S. Adams, B.R. Bloom, and R.L. Modlin, *Science*, **311**, 770 (2006). (*Pharmacol.*)
5) 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.*)
6) P.Y. Ong, T. Ohtake, C. Brandt, I. Strickland, M. Boguniewicz, T. Ganz, R.L. Gallo, and, D.Y.M. Leung, *New Engl. J. Med.*, **347**, 1151 (2002). (*Pharmacol.*)
7) D.W. Hoskin and A. Ramamoorthy, *Biochim. Biophys. Acta*, **1778**, 357 (2008). (*Review*)
8) Y.P. Lai and R.L. Gallo, *Trends Immunol.*, **30**, 131 (2009). (*Review*)
9) M.F. Burton and P.G. Steel, *Nat. Prod. Rep.*, **26**, 1572 (2009). (*Review*)

Magainin

Code	Compound			Price:Yen
4196-v -20℃	**Magainin 1** **(Frog, *Xenopus laevis*)** Gly-Ile-Gly-Lys-Phe-Leu-His-Ser-Ala-Gly-Lys-Phe-Gly-Lys-Ala-Phe-Val-Gly-Glu-Ile-Met-Lys-Ser (M.W. 2409.8) $C_{112}H_{177}N_{29}O_{28}S$ [108433-99-4] *Antimicrobial Peptide* 1) M. Zasloff, *Proc. Natl. Acad. Sci. U.S.A.*, **84**, 5449 (1987). (*Original*)	Vial	0.5 mg	25,500

Margatoxin

Code	Compound			Price:Yen
4290-s -20℃	**Margatoxin** **MgTX** **(Scorpion, *Centruroides margaritatus*)** Thr-Ile-Ile-Asn-Val-Lys-Cys-Thr-Ser-Pro-Lys-Gln-Cys-Leu-Pro-Pro-Cys-Lys-Ala-Gln-Phe-Gly-Gln-Ser-Ala-Gly-Ala-Lys-Cys-Met-Asn-Gly-Lys-Cys-Lys-Cys-Tyr-Pro-His (Reported disulfide bonds between Cys^{7}-Cys^{29}, Cys^{13}-Cys^{34}, and Cys^{17}-Cys^{36}) (M.W. 4178.9) $C_{178}H_{286}N_{52}O_{50}S_7$ [145808-47-5] *Voltage-Dependent K^+ Channel Blocker (Specific for Kv1.3 Channel)* 1) R.J. Leonard, M.L. Garcia, R.S. Slaughter, and J.P. Reuben, *Proc. Natl. Acad. Sci. U.S.A.*, **89**, 10094 (1992). (*Pharmacol.*) 2) M. Garcia-Calvo, R.J. Leonard, J. Novick, S.P. Stevens, W. Schmalhofer, G.J. Kaczorowski, and M.L. Garcia, *J. Biol. Chem.*, **268**, 18866 (1993). (*Original*) 3) M.A. Bednarek, R.M. Bugianesti, R.J. Leonard, and J.P. Felix, *Biochem. Biophys. Res. Commun.*, **198**, 619 (1994). (*Chem. Synthesis & S-S Bond*) 4) H.G. Knaus, R.O.A. Koch, A. Eberhart, G.J. Kaczorowski, M.L. Garcia, and R.S. Slaughter, *Biochemistry*, **34**,13627 (1995). (*Pharmacol.*)	Vial	0.1 mg	22,000

Mastoparan

Code	Compound			Price:Yen
4107-v -20℃	**Mastoparan** **(Wasp, *Vespula lewisii*)** Ile-Asn-Leu-Lys-Ala-Leu-Ala-Ala-Leu-Ala-Lys-Lys-Ile-Leu-NH_2 (M.W. 1478.9) $C_{70}H_{131}N_{19}O_{15}$ [72093-21-1]	Vial	0.5 mg	6,200
4107 -20℃	**Mastoparan** **(Wasp, *Vespula lewisii*)** Ile-Asn-Leu-Lys-Ala-Leu-Ala-Ala-Leu-Ala-Lys-Lys-Ile-Leu-NH_2 • 4AcOH • $6H_2O$ (M.W. 1478.9 • 240.21 • 108.09) $C_{70}H_{131}N_{19}O_{15}$ • $4CH_3COOH$ • $6H_2O$ 1) Y. Hirai, T. Yasuhara, H. Yoshida, T. Nakajima, M. Fujino, and C. Kitada, *Chem. Pharm. Bull.*, **27**, 1942 (1979). (*Original; Chem. Synthesis*)	Bulk	25 mg	110,000

α-Mating Factor

Code	Compound			Price:Yen
4076-v -20℃	**α-Mating Factor** **(Yeast, *Saccharomyces cerevisiae*)** Trp-His-Trp-Leu-Gln-Leu-Lys-Pro-Gly-Gln-Pro-Met-Tyr (M.W. 1684.0) $C_{82}H_{114}N_{20}O_{17}S$ [59401-28-4]	Vial	0.5 mg	7,200

1) D. Stötzler, H.-H. Kilts, and W. Duntze, *Eur. J. Biochem.*, **69**, 397 (1976). (*Original*)
2) T. Tanaka, H. Kita, T. Murakami, and K. Narita, *J. Biochem.*, **82**, 1681 (1977). (*Original*)
3) Y. Masui, N. Chino, S. Sakakibara, T. Tanaka, T. Murakami, and H. Kita, *Biochem. Biophys. Res. Commun.*, **78**, 534 (1977). (*Chem. Synthesis*)

MCD-Peptide

4258-v -20℃	**MCD-Peptide*** **Mast Cell Degranulating Peptide** **(Honeybee, *Apis mellifera*)** Ile-Lys-Cys-Asn-Cys-Lys-Arg-His-Val-Ile-Lys-Pro-His-Ile-Cys-Arg-Lys-Ile-Cys-Gly-Lys-Asn-NH_2 (Disulfide bonds between Cys^3-Cys^{15} and Cys^5-Cys^{19}) (M.W. 2587.2) $C_{110}H_{192}N_{40}O_{24}S_4$ [32908-73-9] *Voltage-Dependent K^+ Channel Blocker*	Vial	0.5 mg	25,000

1) E. Haberman, *Science*, **177**, 314 (1972). (*Review*)
2) M.R. Ziai, S. Russek, H.-C. Wang, B. Beer, and A.J. Blume, *J. Pharm. Pharmacol.*, **42**, 457 (1990). (*Review*)
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Melanin-Concentrating Hormone

4369-v -20℃	**Melanin-Concentrating Hormone (Human)** **MCH (Human)** **(Rat, Mouse)** Asp-Phe-Asp-Met-Leu-Arg-Cys-Met-Leu-Gly-Arg-Val-Tyr-Arg-Pro-Cys-Trp-Gln-Val (Disulfide bond between Cys^7-Cys^{16}) (M.W. 2386.8) $C_{105}H_{160}N_{30}O_{26}S_4$ [128315-56-0] *Appetite Boosting Peptide*	Vial	0.5 mg	15,000

Melanin-Concentrating Hormone (**MCH**) was isolated from salmon pituitary and was found to induce aggregation of melanin granules in melanophores. Later, a mammalian homolog was identified in rat hypothalamus as a 19 amino acid peptide with a single disulfide bond [*Endocrinology*, **125**, 1660 (1989)]. Subsequently, the human **MCH** sequence was found to be the same as that of the rat peptide[1]. Interestingly, the **MCH** of hypothalamus was reported in 1996 to be involved in the regulation of body weight[2]. Actually, the injection of **MCH** into the lateral ventricles increased food consumption in rats. Further evidence in the literature indicates that **MCH**-deficient mice are lean due to hypophagia[3].

1) K.M. Knigge, D. Baxter-Grillo, J. Speciale, and J. Wagner, *Peptides*, **17**, 1063 (1996). (*Review*)
2) D. Qu, D.S. Ludwig, S. Gammeltoft, M. Piper, M.A. Pelleymounter, M.J. Cullen, W.F. Mathes, J. Przypek, R. Kanarek, and E. Maratos-Flier, *Nature*, **380**, 243 (1996). (*Pharmacol.*)
3) M. Shimada, N.A. Tritos, B.B. Lowell, J.S. Flier, and E. Maratos-Flier, *Nature*, **396**, 670 (1998). (*Pharmacol.*)
4) J. Chambers, R.S. Ames, D. Bergsma, A. Muir, L.R. Fitzgerald, G. Hervieu, G.M. Dytko, J.J. Foley, J. Martin, W.-S. Liu, J. Park, C. Ellis, S. Ganguly, S. Konchar, J. Cluderay, R. Leslie, S. Wilson, and H.M. Sarau, *Nature*, **400**, 261 (1999). (*Pharmacol.; Ligand for Orphan SLC-1 Receptor*)
5) Y, Saito, H.-P. Nothacker, Z. Wang, S.H.S. Lin, F. Leslie, and O. Civelli, *Nature*, **400**, 265 (1999). (*Pharmacol.; Ligand for Orphan SLC-1 Receptor*)
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* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Melanocyte Stimulating Hormone (MSH) and Related Peptide

Code	Compound			Price:Yen
4057-v -20℃	**α-MSH** **α-Melanocyte Stimulating Hormone** **(Human, Porcine, Bovine, Rat, Mouse)** Ac-Ser-Tyr-Ser-Met-Glu-His-Phe-Arg-Trp-Gly-Lys-Pro-Val-NH_2 (M.W. 1664.9) $C_{77}H_{109}N_{21}O_{19}S$ [581-05-5]	Vial	0.5 mg	5,700
4024 -20℃	**MSH-Release Inhibiting Factor** **MIF** Pro-Leu-Gly-NH_2 • $^1/_2H_2O$ (M.W. 284.35 • 9.01) $C_{13}H_{24}N_4O_3$ • $^1/_2H_2O$ [2002-44-0]	Bulk	25 mg 100 mg	2,200 5,000

1) T.H. Lee and A.B. Lerner, *J. Biol. Chem.*, **221**, 943 (1956). (*Original; Porcine*)
2) R.A. Boissonnas, St. Guttmann, R.L. Huguenin, P.-A. Jaquenoud, and E. Sandrin, *Helv. Chim. Acta*, **41**, 1867 (1958). (*Chem. Synthesis*)
3) R. Schwyzer, A. Costpanagiotis, and P. Sieber, *Helv. Chim. Acta*, **46**, 870 (1963). (*Chem. Synthesis*)
4) A.C.Y. Chang, M. Cochet, S.N. Cohen, *Proc. Natl. Acad. Sci. U.S.A.*, **77**, 4890 (1980). (*Nucleotide Seq.; Human*)

Midkines

Code	Compound			Price:Yen
4298-v -20℃	**Midkine (Human)** Lys-Lys-Lys-Asp-Lys-Val-Lys-Lys-Gly-Gly-Pro-Gly-Ser-Glu-Cys-Ala-Glu-Trp-Ala-Trp-Gly-Pro-Cys-Thr-Pro-Ser-Ser-Lys-Asp-Cys-Gly-Val-Gly-Phe-Arg-Glu-Gly-Thr-Cys-Gly-Ala-Gln-Thr-Gln-Arg-Ile-Arg-Cys-Arg-Val-Pro-Cys-Asn-Trp-Lys-Lys-Glu-Phe-Gly-Ala-Asp-Cys-Lys-Tyr-Lys-Phe-Glu-Asn-Trp-Gly-Ala-Cys-Asp-Gly-Gly-Thr-Gly-Thr-Lys-Val-Arg-Gln-Gly-Thr-Leu-Lys-Lys-Ala-Arg-Tyr-Asn-Ala-Gln-Cys-Gln-Glu-Thr-Ile-Arg-Val-Thr-Lys-Pro-Cys-Thr-Pro-Lys-Thr-Lys-Ala-Lys-Ala-Lys-Ala-Lys-Lys-Gly-Lys-Gly-Lys-Asp (Disulfide bonds between Cys^{15}-Cys^{39}, Cys^{23}-Cys^{48}, Cys^{30}-Cys^{52}, Cys^{62}-Cys^{94}, and Cys^{72}-Cys^{104}) (M.W. 13240.1) $C_{570}H_{915}N_{177}O_{167}S_{10}$ [170138-17-7] *Heparin-Binding Growth / Differentiation Factor* *(Neurotrophic Factor, Neurite Outgrowth-Promoting Factor)* *Plasminogen Activator Activity Enhancer*	Vial	50 µg	30,000

1) J.-i. Tsutsui, K. Uehara, K. Kadomatsu, S. Matsubara, and T. Muramatsu, *Biochem. Biophys. Res. Commun.*, **176**, 792 (1991). (*Original*)
2) H. Muramatsu, T. Inui, T. Kimura, S. Sakakibara, X.-j. Song, H. Maruta, and T. Muramatsu, *Biochem. Biophys. Res. Commun.*, **203**, 1131 (1994). (*Pharmacol.*)
3) T. Inui, J. Bódi, S. Kubo, H. Nishio, T. Kimura, S. Kojima, H. Maruta, T. Muramatsu, and S. Sakakibara, *J. Peptide Sci.*, **2**, 28 (1996). (*Chem. Synthesis*)
4) G.S.P. Yu, J. Hu, and H. Nakagawa, *Neurosci. Lett.*, **254**, 128 (1998). (*Pharmacol.; Inhibition of β-amyloid cytotoxicity*)

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Midkines (continued)

Code	Compound			Price:Yen
4299-s -20℃	**Midkine (Human, 60-121)** Ala-Asp-Cys-Lys-Tyr-Lys-Phe-Glu-Asn-Trp-Gly-Ala-Cys-Asp-Gly-Gly-Thr-Gly-Thr-Lys-Val-Arg-Gln-Gly-Thr-Leu-Lys-Lys-Ala-Arg-Tyr-Asn-Ala-Gln-Cys-Gln-Glu-Thr-Ile-Arg-Val-Thr-Lys-Pro-Cys-Thr-Pro-Lys-Thr-Lys-Ala-Lys-Ala-Lys-Ala-Lys-Lys-Gly-Lys-Gly-Lys-Asp (Disulfide bonds between Cys^{62}-Cys^{94} and Cys^{72}-Cys^{104}) (M.W. 6788.8) $C_{292}H_{483}N_{91}O_{87}S_4$ *Heparin-Binding Growth / Differentiation Factor Active-Domain* *(Neurite Outgrowth-Promoting Factor)* *Plasminogen Activator Activity Enhancer*	Vial	0.1 mg	30,000

1) J.-i. Tsutsui, K. Uehara, K. Kadomatsu, S. Matsubara, and T. Muramatsu, *Biochem. Biophys. Res. Commun.*, **176**, 792 (1991). (*Original*)
2) H. Muramatsu, T. Inui, T. Kimura, S. Sakakibara, X.-j. Song, H. Maruta, and T. Muramatsu, *Biochem. Biophys. Res. Commun.*, **203**, 1131 (1994). (*Pharmacol.*)
3) T. Inui, J. Bódi, S. Kubo, H. Nishio, T. Kimura, S. Kojima, H. Maruta, T. Muramatsu, and S. Sakakibara, *J. Peptide Sci.*, **2**, 28 (1996). (*Chem. Synthesis*)
4) G.S.P. Yu, J. Hu, and H. Nakagawa, *Neurosci. Lett.*, **254**, 128 (1998). (*Pharmacol.; Inhibition of β-amyloid cytotoxicity*)

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Molluscan Cardioexcitatory Neuropeptide

Code	Compound			Price:Yen
4142-v -20℃	**FMRF-Amide*** **Molluscan Cardioexcitatory Neuropeptide** Phe-Met-Arg-Phe-NH_2 (M.W. 598.76) $C_{29}H_{42}N_8O_4S$ [64190-70-1]	Vial	0.5 mg	2,400
4142 -20℃	**FMRF-Amide*** **Molluscan Cardioexcitatory Neuropeptide** Phe-Met-Arg-Phe-NH_2 • $1^1/_2$AcOH • $2H_2O$ (M.W. 598.76 • 90.08 • 36.03) $C_{29}H_{42}N_8O_4S$ • $1^1/_2CH_3COOH$ • $2H_2O$	Bulk	25 mg 100 mg	23,000 65,000

1) D.A. Price and M.J. Greenberg, *Science*, **197**, 670 (1977). (*Original*)

Morphine Tolerance Peptide

Code	Compound			Price:Yen
4070 -20℃	**Morphine Tolerance Peptide** *cyclo* (Leu-Gly) (M.W. 170.21) $C_8H_{14}N_2O_2$ [5845-67-0]	Bulk	25 mg 100 mg	4,100 11,400

1) R. Walter, R. Ritzmann, H.N. Bhargava, and L.B. Flexner, *Proc. Natl. Acad. Sci. U.S.A.*, **76**, 518 (1979). (*Original*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Motilin

Code	Compound			Price:Yen
4147-v -20℃	**Motilin (Human, Porcine)** Phe-Val-Pro-Ile-Phe-Thr-Tyr-Gly-Glu-Leu-Gln-Arg-Met-Gln-Glu-Lys-Glu-Arg-Asn-Lys-Gly-Gln (M.W. 2699.0) $C_{120}H_{188}N_{34}O_{35}S$ [52906-92-0]	Vial	0.5 mg	28,500

1) J.C. Brown, M.A. Cook, and J.R. Dryburgh, *Can. J. Biochem.*, **51**, 533 (1973). (*Original; Porcine*)
2) H. Schubert and J.C. Brown, *Can. J. Biochem.*, **52**, 7 (1974). (*Correction of Sequence; Gln*^{14})
3) Y. Seino, K. Tanaka, H. Takahashi, T. Mitani, M. Kurono, T. Kayano, G. Koh, H. Fukumoto, H. Yano, J. Fujita, N. Inagaki, Y. Yamada, and H. Imura, *FEBS Lett.*, **223**, 74 (1987). (*Original; Human-cDNA*)
4) C.H.S. McIntosh and J.C. Brown, *Adv. Metab. Dis.*, **11**, 439 (1988). (*Review*)

MSH See Code 4057 **α-MSH (α-Melanocyte Stimulating Hormone)** on page 94

Muramyl Dipeptide See Code 4031 **Adjuvant Peptide** on page 2 and 258

Muscarinic Toxins

1) K.N. Bradley, *Pharmacol. Ther.*, **85**, *87 (2000).* (*Review*)
2) L.T. Potter, *Life Sci.*, **68**, *2541 (2001).* (*Review*)
3) D. Servent and C. Fruchart-Gaillard, *J. Neurochem.*, **109**, 1193 (2009). (*Review*)
4) E. Karlsson, M. Jolkkonen, E. Mulugeta, P. Onali, and A. Adem, *Biochimie*, **82**, 793 (2000). (*Review*)

List of Muscarinic Toxins

	Code	Compound	Specificity	Quantity	Price: Yen	Page
	4341-s	**Muscarinic Toxin 1 (MT1, MTX1)**	$M_{1/4}$	0.1 mg vial	30,000	below
	4410-s	**Muscarinic Toxin 3 (MT3, MTX3, m4-toxin)**	M_4	0.1 mg vial	30,000	97
	4340-s	**Muscarinic Toxin 7 (MT7, MTX7, m1-toxin1)**	M_1	0.1 mg vial	30,000	97
	4424-s	**Muscarinic Toxin α (MTα)**	$M_{3/4/5}$	0.1 mg vial	30,000	98

4341-s **Muscarinic Toxin 1** Vial 0.1 mg 30,000
-20℃
MT1, MTX1
(Green Mamba, *Dendroaspis angusticeps*)
Leu-Thr-Cys-Val-Thr-Ser-Lys-Ser-Ile-Phe-Gly-Ile-Thr-Thr-Glu-Asn-Cys-Pro-Asp-Gly-Gln-Asn-Leu-Cys-Phe-Lys-Lys-Trp-Tyr-Tyr-Ile-Val-Pro-Arg-Tyr-Ser-Asp-Ile-Thr-Trp-Gly-Cys-Ala-Ala-Thr-Cys-Pro-Lys-Pro-Thr-Asn-Val-Arg-Glu-Thr-Ile-Arg-Cys-Cys-Glu-Thr-Asp-Lys-Cys-Asn-Glu
(Disulfide bonds between Cys^3-Cys^{24}, Cys^{17}-Cys^{42}, Cys^{46}-Cys^{58}, and Cys^{59}-Cys^{64})
(M.W. 7509.5) $C_{326}H_{499}N_{87}O_{101}S_8$
Purity Information : Q_P See page IV (XVI)

Agonist for Muscarinic Acetylcholine Receptor-1/4 (M_1 / M_4) (Non-specific Ligand)

1) M. Jolkkonen, A. Adem, U. Hellman, C. Wernstedt, and E. Karlsson,*Toxicon*, **33**, 399 (1995). (*Original-Structure*)
2) D. Jerusalinsky and A.L. Harvey, *Trends Pharmacol. Sci.*, **15**, 424 (1994). (*Review; Toxin for Muscarinic Receptor*)
3) A. Adem and E. Karlsson, *Life Sci.*, **60**, 1069 (1997). (*Pharmacol.*)
4) H.Nishio, Y. Nishiuchi, T. Inui, K.N. Bradley, A.L. Harvey, and T. Kimura, *Peptide Science 1999*, 125 (2000). (*S-S Bond*)

Code	Compound			Price:Yen
4410-s -20℃	**Muscarinic Toxin 3** **MT3, MTX3, m4-toxin** **(Green Mamba, *Dendroaspis angusticeps*)** Leu-Thr-Cys-Val-Thr-Lys-Asn-Thr-Ile-Phe- Gly-Ile-Thr-Thr-Glu-Asn-Cys-Pro-Ala-Gly- Gln-Asn-Leu-Cys-Phe-Lys-Arg-Trp-His-Tyr- Val-Ile-Pro-Arg-Tyr-Thr-Glu-Ile-Thr-Arg- Gly-Cys-Ala-Ala-Thr-Cys-Pro-Ile-Pro-Glu- Asn-Tyr-Asp-Ser-Ile-His-Cys-Cys-Lys-Thr- Asp-Lys-Cys-Asn-Glu (Disulfide bonds between Cys^{3}-Cys^{24}, Cys^{17}-Cys^{42}, Cys^{46}-Cys^{57}, and Cys^{58}-Cys^{63}) (M.W. 7379.4) $C_{319}H_{489}N_{89}O_{97}S_{8}$ *Specifc Ligand for Muscarinic Acetylcholine Receptor-4 (M_4)* References: see page 98	Vial	0.1 mg	30,000
4340-s -20℃	**Muscarinic Toxin 7** **MT7, MTX7, m1-toxin1** **(Green Mamba, *Dendroaspis angusticeps*)** Leu-Thr-Cys-Val-Lys-Ser-Asn-Ser-Ile-Trp- Phe-Pro-Thr-Ser-Glu-Asp-Cys-Pro-Asp-Gly- Gln-Asn-Leu-Cys-Phe-Lys-Arg-Trp-Gln-Tyr- Ile-Ser-Pro-Arg-Met-Tyr-Asp-Phe-Thr-Arg- Gly-Cys-Ala-Ala-Thr-Cys-Pro-Lys-Ala-Glu- Tyr-Arg-Asp-Val-Ile-Asn-Cys-Cys-Gly-Thr- Asp-Lys-Cys-Asn-Lys (Disulfide bonds between Cys^{3}-Cys^{24}, Cys^{17}-Cys^{42}, Cys^{46}-Cys^{57}, and Cys^{58}-Cys^{63}) (M.W. 7472.4) $C_{322}H_{484}N_{90}O_{98}S_{9}$ *Specific Ligand for Muscarinic Acetylcholine Receptor-1 (M_1)* 1) A. Adem and E. Karlsson, *Life Sci.*, **60**, 1069 (1997). (*Original*) 2) H.Nishio, Y. Nishiuchi, T. Inui, K.N. Bradley, A.L. Harvey, and T. Kimura, *Peptide Science 1999*, 125 (2000). (*S-S Bond*) 3) J.M.Carsi and L.T. Potter, *Toxicon*, **38**, 187 (2000). (*Original; m1-toxin1*) 4) Z. Gu, P. Zhong, and Z. Yan, *J. Biol. Chem.*, **278**, 17546 (2003). (*Pharmacol; Inhibition of β-Amyloid signaling*)	Vial	0.1 mg	30,000

Code	Compound			Price:Yen
4424-s -20℃	**Muscarinic Toxin α** **MTα** **(Black Mamba, *Dendroaspis polylepis*)** Leu-Thr-Cys-Val-Thr-Ser-Lys-Ser-Ile-Phe- Gly-Ile-Thr-Thr-Glu-Asn-Cys-Pro-Asp-Gly- Gln-Asn-Leu-Cys-Phe-Lys-Lys-Trp-Tyr-Tyr- Leu-Asn-His-Arg-Tyr-Ser-Asp-Ile-Thr-Trp- Gly-Cys-Ala-Ala-Thr-Cys-Pro-Lys-Pro-Thr- Asn-Val-Arg-Glu-Thr-Ile-His-Cys-Cys-Glu- Thr-Asp-Lys-Cys-Asn-Glu (Disulfide bonds between Cys^3-Cys^{24}, Cys^{17}-Cys^{42}, Cys^{46}-Cys^{58}, and Cys^{59}-Cys^{64}) (M.W. 7545.4) $C_{326}H_{491}N_{89}O_{102}S_8$ *Ligand for Muscarinic Acetylcholine Receptor-3/4/5 (M_3/M_4/M_5) (Non-specific Ligand)*	Vial	0.1 mg	30,000

Muscarinic acetylcholine receptors have been classified into five subtypes (M_1 to M_5). These receptors are involved in various biological functions, which can be studied using specific ligands to each receptor subtype, including the peptidic "muscarinic toxin" (abbreviated as MT in this short description). Muscarinic toxins are isolated from the venom of the mamba species and are composed of 65 to 66 amino acid residues with four intramolecular disulfide linkages[1]. It is indicated that the activation of muscarinic acetylcholine receptors can regulate the metabolism of amyloid precursor protein, and that muscarinic agonists led to a reduction of amyloid β-protein production[2, 3]. For example, synthetic MT7 (Code 4340-s) has been used to study M_1 receptor's role in amyloid β-protein-induced signaling[4].

We successfully synthesized another two muscarinic toxins bearing different receptor subtype selectivity. These are **muscarinic toxin 3** (**MT3**) and **muscarinic toxin α** (**MTα**). We determined the disulfide arrangement of synthetic **MT3**[5] and **MTα**, although the experimental details have not yet published for **MTα**. **MT3** was isolated from the green mamba *Dendroaspis angusticeps* and is composed of 65 amino acid residues. This peptide shows selectivity for the M_4 receptor with low affinity to M_1 receptor, and no binding to M_2, M_3, and M_5 receptors[6-9]. Another 66-residue peptide toxin, **MTα** is reported to be a component of the venomous toxins of the black mamba *Dendroaspis polylepis*. This peptide possesses high affinity to all five subtypes; inhibition constants for M_1 through M_5 are 23 nM, 44 nM, 3 nM, 5 nM, and 8 nM, respectively[8, 10, 11]. As far as we know, a specific ligand to M_3 and M_5 does not exist, thus, **MTα** is attractive for this reason although the subtype selectivity is rather low.

Combined utilization with already commercially available MT1 (Code 4341-s) and MT7, the research concerning biological functions elicited through muscarinic acetylcholine receptors should advance significantly, using these chemically synthesized **MT3** and **MTα**.

1) K.N. Bradley, *Pharmacol. Ther.*, **85**, 87 (2000). (*Review*)
2) T.G. Beach, D.G. Walker, P.E. Potter, L.I. Sue, and A. Fisher, *Brain Res.*, **905**, 220 (2001). (*Pharmacol.*)
3) C. Hock, A. Maddalena, A. Raschig, F. Müller-Spahn, G. Eschweiler, K. Hager, I. Heuser, H. Hampel, T. Müller-Thomsen, W. Oertel M. Wienrich, A. Signorell, C. Gonzalez-Agosti, and R.M. Nitsch, *J. Protein Folding Disord.*, **10**, 1 (2003). (*Pharmacol.*)
4) Z. Gu, P. Zhong, and Z. Yan, *J. Biol. Chem.*, **278**, 17546 (2003). (*Pharmacol.; Role in Aβ-Induced Signaling*)
5) S. Katayama, M. Ishimaru, H. Nishio, Y. Nishiuchi, and T. Kimura, *Peptide Science 2004*, 161 (2005). (*S-S Bond of MT3*)
6) M. Jolkkonen, P.L.M. van Giersbergen, U. Hellman, C. Wernstedt, and E. Karlsson, *FEBS Lett.*, **352**, 91 (1994). (*Original; MT3*)
7) J.-S. Liang, J. Carsi-Gabrenas, J.L. Krajewski, J.M. McCafferty, S.L. Purkerson, M.P. Santiago, W.L. Strauss, H.H. Valentine, and L.T. Potter, *Toxicon*, **34**, 1257 (1996). (*Original; m4-toxin*)
8) A. Adem and E. Karlsson, *Life Sci.*, **60**, 1069 (1997). (*Pharmacol.; Muscarinic Receptor Subtype Specificity*)
9) M. C. Olianas, A. Adem, E. Karlsson, and P. Onali, *Eur. J. Pharmacol.*, **357**, 235 (1998). (*Pharmacol.; cAMP-Coupled M_4 Receptor*)
10) M. Jolkkonen, P.L.M. van Giersbergen, U. Hellman, C. Wernstedt, A. Oras, N. Satyapan, A. Adem, and E. Karlsson, *Eur. J. Biochem.*, **234**, 579 (1995). (*Original; MTα*)
11) M. Jolkkonen, A. Oras, T. Toomela, E. Karlsson, J. Järv, and K.E.O. Åkerman, *Toxicon*, **39**, 377 (2001). (*Pharmacol.; Mechanism of Receptor Binding*)

Na^+, K^+-ATPase Inhibitor-1 See Code 4216 **SPAI-1 (Porcine)** on page 140

Neuroendocrine Regulatory Peptides

Code	Compound			Price:Yen
4441-s -20℃	**Neuroendocrine Regulatory Peptide-1 (Human)** **NERP-1 (Human)** 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. 2679.0) $C_{113}H_{192}N_{36}O_{39}$ [954420-50-9] *Endogenous Suppressor of Vasopressin Release*	Vial	0.1 mg	10,000
4442-s -20℃	**Neuroendocrine Regulatory Peptide-1 (Rat)** **NERP-1 (Rat)** 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. 2558.8) $C_{110}H_{180}N_{32}O_{38}$ [954420-51-0] *Endogenous Suppressor of Vasopressin Release*	Vial	0.1 mg	10,000
4443-s -20℃	**Neuroendocrine Regulatory Peptide-2 (Human)** **NERP-2 (Human)** 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. 4064.5) $C_{173}H_{288}N_{56}O_{57}$ *Endogenous Suppressor of Vasopressin Release*	Vial	0.1 mg	13,000

Neuroendocrine Regulatory Peptides (continued)

Code	Compound			Price:Yen
4444-s -20℃	**Neuroendocrine Regulatory Peptide-2 (Rat)** **NERP-2 (Rat)** 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. 4122.5) $C_{175}H_{290}N_{56}O_{59}$ *Endogenous Suppressor of Vasopressin Release*	Vial	0.1 mg	13,000

"**Peptidome**", one of the principle research fields in the post-genome era, is a powerful method to discover novel peptides [http://www.peptidome.jp]. One such study has been reported recently from the collaboration of several groups including National Cardiovascular Center Research Institute and University of Miyazaki. The peptides disclosed are **neuroendocrine regulatory peptide-1 and -2** (abbreviated as **NERP-1** and **NERP-2**, respectively).

Both peptides were isolated either from medullary thyroid carcinoma TT cells or rat brain applying modern techniques of peptide chemistry / biochemistry. Human and rat **NERP-1** are composed of 26 and 25 amino acid residues, respectively, and **NERP-2** of both species are composed of 38 amino acid residues, all contain the carboxyl-terminal amide functionality. Interestingly, these peptides were the segments of the neurosecretory protein VGF, suggesting a unique processing signal for **NERP-2**.

NERP-1 (Human): **RP**E**SAL**LGGSEAGERLLQQGLAQVEA-NH_2
NERP-1 (Rat): **L**E**GSF**LGGSEAGERLLQQGLAQVEA-NH_2

NERP-2 (Human): <EAEATRQAAAQEERLADLASDLLLQYLLQGGARQR**G**LG-NH_2
NERP-2 (Rat): <EAEATRQAAAQEERLADLASDLLLQYLLQGGARQR**D**LG-NH_2

Biological activity reported is: **i)** suppression of vasopressin release induced by intracerebroventricular administration of angiotensin II in rat and **ii)** suppression of basal and angiotensin II-induced vasopressin secretion from the paraventricular and supraoptic nuclei of rat hypothalamus *in vitro*. Considering the fact that **NERP**s coexist with vasopressin in the hypothalamus, these newly identified peptides may be "potent endogenous suppressor of vasopressin release", thus implying an essential role in body fluid homeostasis.

1) H. Yamaguchi, K. Sasaki, Y. Satomi, T. Shimbara, H. Kageyama, M.S. Mondal, K. Toshinai, Y. Date, L.J. González, S. Shioda, T. Takao, M. Nakazato, and N. Minamino, *J. Biol., Chem.*, **282**, 26354 (2007). (*Original*)
2) E. Mishiro-Sato, K. Sasaki, T. Matsuo, H. Kageyama, H. Yamaguchi, Y. Date, M. Matsubara, T. Ishizu, K. Yoshizawa-Kumagaye, Y. Satomi, T. Takao, S. Shioda, M. Nakazato, and N. Minamino, *J. Neurochem.*, **114**, 1097 (2010). (*Processing & Histochem.*)

Neo-Endorphins

4090-v -20℃	**α-Neo-Endorphin (Porcine)** Tyr-Gly-Gly-Phe-Leu-Arg-Lys-Tyr-Pro-Lys (M.W. 1228.4) $C_{60}H_{89}N_{15}O_{13}$	Vial	0.5 mg	6,600

1) K. Kangawa, N. Minamino, N. Chino, S. Sakakibara, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **99**, 871 (1981). (*Original*)

4091-v -20℃	**β-Neo-Endorphin (Porcine)** Tyr-Gly-Gly-Phe-Leu-Arg-Lys-Tyr-Pro (M.W. 1100.3) $C_{54}H_{77}N_{13}O_{12}$ [77739-21-0]	Vial	0.5 mg	6,600

1) N. Minamino, K. Kangawa, N. Chino, S. Sakakibara, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **99**, 864 (1981). (*Original*)

Neurokinins

Code	Compound			Price:Yen
4154-v -20℃	**Neurokinin A***	Vial	0.5 mg	3,900
	Neuromedin L, Substance K **(Human, Porcine, Rat, Mouse)** His-Lys-Thr-Asp-Ser-Phe-Val-Gly-Leu-Met-NH_2 (M.W. 1133.3) $C_{50}H_{80}N_{14}O_{14}S$ [86933-74-6]			
4154 -20℃	**Neurokinin A***	Bulk	25 mg	59,000
	Neuromedin L, Substance K **(Human, Porcine, Rat, Mouse)** His-Lys-Thr-Asp-Ser-Phe-Val-Gly-Leu-Met-NH_2 • 2AcOH • $5H_2O$ (M.W. 1133.3 • 120.10 • 90.08) $C_{50}H_{80}N_{14}O_{14}S$ • $2CH_3COOH$ • $5H_2O$ *NK_2 Receptor Selective Agonist* 1) S. Kimura, M. Okada, Y. Sugita, I. Kanazawa, and E. Munekata, *Proc. Jpn. Acad.*, **59 (B)**, 101 (1983). (*Original; Porcine Neurokinin A*) 2) K. Kangawa, N. Minamino, A. Fukuda, and H. Matsuo, *Peptide Chemistry* 1983, 309 (1984). (*Original; Porcine Neuromedin L*) 3) H. Nawa, T. Hirose, H. Takashima, S. Inayama, and S. Nakanishi, *Nature*, **306**, 32 (1983). (*Original; Porcine Substance K*) 4) A.J. Harmar, A. Armstrong, J.C. Pascall, K. Chapman, R. Rosie, A. Curtis, J. Going, C.R.W. Edwards, and G. Fink, *FEBS Lett.*, **208**, 67 (1986). (*cDNA Seq.; Human*)			
4317-v -20℃	**Neurokinin B**	Vial	0.5 mg	3,900
	Neuromedin K **(Human, Porcine, Bovine, Rat, Mouse)** Asp-Met-His-Asp-Phe-Phe-Val-Gly-Leu-Met-NH_2 (M.W. 1210.4) $C_{55}H_{79}N_{13}O_{14}S_2$ [86933-75-7]			
4317 -20℃	**Neurokinin B**	Bulk	25 mg	59,000
	Neuromedin K **(Human, Porcine, Bovine, Rat, Mouse)** Asp-Met-His-Asp-Phe-Phe-Val-Gly-Leu-Met-NH_2 • $^1/_2$AcOH• $4H_2O$ (M.W. 1210.4 •30.03• 72.06) $C_{55}H_{79}N_{13}O_{14}S_2$ • $^1/_2CH_3COOH$• $4H_2O$ *NK_3 Receptor Selective Agonist* 1) S. Kimura, M. Okada, Y. Sugita, I. Kanazawa, and E. Munekata, *Proc. Jpn. Acad.*, **59 (B)**, 101 (1983). (*Original; Porcine Neurokinin B*) 2) K. Kangawa, N. Minamino, A. Fukuda, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **114**, 533 (1983). (*Original; Porcine Neuromedin K*) 3) M.K. Chawla, G.M. Gutierrez, W.S. Young III, N.T. McMullen, and N.E. Rance, *J. Comp. Neurol.*, **384**, 429 (1997). (*Neurokinin B Nucleotide Seq.; Human*) 4) T.I. Bonner., H.-U. Affolter, A.C. Young, and W.S. Young III, *Mol. Brain Res.*, **2**, 243 (1987). (*cDNA Seq.; Rat*)			

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

List of Neuromedins

Code	Compound	Quantity	Price: Yen	Page
4152-v	**Neuromedin B**	0.5 mg vial	3,900	102
4153-v	**Neuromedin C [GRP (18-27)]**	0.5 mg vial	3,900	102
4426-s	**Neuromedin S (Human)**	0.1 mg vial	11,000	103
4427-s	**Neuromedin S (Rat)**	0.1 mg vial	12,000	103
4377-v	**Neuromedin U (Rat)**	0.5 mg vial	20,000	104

Code	Compound			Price:Yen
4152-v -20℃	**Neuromedin B***	Vial	0.5 mg	3,900
	(Human, Porcine, Rat) Gly-Asn-Leu-Trp-Ala-Thr-Gly-His-Phe-Met-NH_2 (M.W. 1132.3) $C_{52}H_{73}N_{15}O_{12}S$ [87096-84-2]			
4152 -20℃	**Neuromedin B***	Bulk	25 mg	59,000
	(Human, Porcine, Rat) Gly-Asn-Leu-Trp-Ala-Thr-Gly-His-Phe-Met-NH_2 •AcOH • $5H_2O$ (M.W. 1132.3 • 60.05 • 90.08) $C_{52}H_{73}N_{15}O_{12}S$ • CH_3COOH • $5H_2O$			
	1) N. Minamino, K. Kangawa, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **114**, 541 (1983). (*Original; Porcine*) 2) I.M. Krane, S.L. Naylor, D. Helin-Davis, W.W. Chin, E.R. Spindel, *J. Biol. Chem.*, **263**, 13317 (1988). (*cDNA Seq.; Human*) 3) E. Wada, J. Way, A.M. Lebacq-Verheyden, J.F. Battey, *J. Neurosci.*, **10**, 2917 (1990). (*cDNA Seq.; Rat*)			
4153-v -20℃	**Neuromedin C***	Vial	0.5 mg	3,900
	Gastrin Releasing Peptide (Human, 18-27) **GRP (18-27)** **(Human, Porcine, Canine)** Gly-Asn-His-Trp-Ala-Val-Gly-His-Leu-Met-NH_2 (M.W. 1120.3) $C_{50}H_{73}N_{17}O_{11}S$ [81608-30-2]			
4153 -20℃	**Neuromedin C***	Bulk	25 mg	59,000
	Gastrin Releasing Peptide (Human, 18-27) **GRP (18-27)** **(Human, Porcine, Canine)** Gly-Asn-His-Trp-Ala-Val-Gly-His-Leu-Met-NH_2 • 2AcOH • $5H_2O$ (M.W. 1120.3 • 120.10 • 90.08) $C_{50}H_{73}N_{17}O_{11}S$ • $2CH_3COOH$ • $5H_2O$			
	1) K.A. Roth, C.J. Evans, R.G. Lorenz, E. Weber, J.D. Barchas, and J.K. Chang, *Biochem. Biophys. Res. Commun.*, **112**, 528 (1983). (*Original; GRP (18-27)*) 2) N. Minamino, K. Kangawa, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **119**, 14 (1984). (*Original; Porcine Neuromedin C*) 3) M.S. Orloff, J.R. Reeve, Jr., C.M. Ben-Avram, J.E. Shively, and J.H. Walsh, *Peptides*, **5**, 865 (1984). (*Seq.; Human*) 4) J.R. Reeve, Jr., H. Walsh, P. Chew, B. Clark, D. Hawke, and J.E. Shively, *J. Biol. Chem.*, **258**, 5582 (1983). (*Isolation & Seq.; Canine Bombesin-like Peptide*)			

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Code	Compound			Price:Yen
4426-s -20℃	**Neuromedin S (Human)** **NMS (Human)** Ile-Leu-Gln-Arg-Gly-Ser-Gly-Thr-Ala-Ala-Val-Asp-Phe-Thr-Lys-Lys-Asp-His-Thr-Ala-Thr-Trp-Gly-Arg-Pro-Phe-Phe-Leu-Phe-Arg-Pro-Arg-Asn-NH_2 (M.W. 3791.3) $C_{173}H_{265}N_{53}O_{44}$	Vial	0.1 mg	11,000
4427-s -20℃	**Neuromedin S (Rat)** **NMS (Rat)** Leu-Pro-Arg-Leu-Leu-His-Thr-Asp-Ser-Arg-Met-Ala-Thr-Ile-Asp-Phe-Pro-Lys-Lys-Asp-Pro-Thr-Thr-Ser-Leu-Gly-Arg-Pro-Phe-Phe-Leu-Phe-Arg-Pro-Arg-Asn-NH_2 (M.W. 4241.9) $C_{193}H_{307}N_{57}O_{49}S$	Vial	0.1 mg	12,000

Food Intake Suppressor / Regulator of Circadian Rhythm

- This compound is distributed through Peptide Institute, Inc. under the license of National Cardiovascular Center and Takeda Pharmaceutical Company Limited.

Neuromedin S (**NMS**) was discovered from rat brain extracts applying a reverse-pharmacological technique using FM-4/TGR-1 as the target orphan receptor. Based on the partial amino acid sequence of the isolated peptide, the cDNA sequences of rat, mouse, and human **NMS** was deduced, showing that the former two peptides are composed of 36 amino acid residues, and the latter of 33 amino acid residues, respectively. All of these peptides have the carboxyl-terminal amide structure. Very interestingly, the carboxyl-terminal 7 residues of these **NMS**s are identical to that of neuromedin U (NMU, code 4377-v for the rat peptide), which is also known to be the ligand of FM-3/GPR66 (NMU receptor type-1) and FM-4/TGR-1 (NMU receptor type-2).

Intracerebroventricular administration of **NMS** (1 nmol) affects the circadian rhythm of locomotor activity in rats[1]. **NMS** is also found to be an anorexic hormone having the following characteristics[2]: **i)** food intake suppression of **NMS** in rats (1 nmol) is more potent than that of NMU, **ii)** **NMS** counteracts the neuropeptide Y (NPY), ghrelin, and agouti-related protein (AGRP)-evoked food intake stimulation, and **iii)** **NMS** augments the level of proopiomelanocortin mRNA and corticotropin-releasing factor mRNA, suggesting the involvement of these peptides in its anorexigenic effects of **NMS**.

1) K. Mori, M. Miyazato, T. Ida, N. Murakami, R. Serino, Y. Ueta, M. Kojima, and K. Kangawa, *EMBO J.*, **24**, 325 (2005). (*Original*)
2) T. Ida, K. Mori, M. Miyazato, Y. Egi, S. Abe, K. Nakahara, M. Nishihara, K. Kangawa, and N. Murakami, *Endocrinology*, **146**, 4217 (2005). (*Pharmacol.; Anorexic Hormone*)
3) E. Vigo, J. Roa, M. López, J.M. Castellano, R. Fernandez-Fernandez, V.M. Navarro, R. Pineda, E. Aguilar, C. Diéguez, L. Pinilla, and M. Tena-Sempere, *Endocrinology*, **148**, 813 (2007). (*Pharmacol.; Effect on LH Secretion*)
4) T. Sakamoto, K. Mori, K. Nakahara, M. Miyazato, K. Kangawa, H. Sameshima, and N. Murakami, *Biochem. Biophys. Res. Commun.*, **361**, 457 (2007). (*Pharmacol.; Antidiuretic Effect*)
5) M. Jászberényi, Z. Bagasi, B. Thurzó, I. Földesi, and G. Telegdy, *Horm. Behav.*, **52**, 631 (2007). (*Pharmacol.; Endocrine & Behavioral Effect*)
6) A. Peier, J. Kosinski, K. Cox-York, Y. Qian, K. Desai, Y. Feng, P. Trivedi, N. Hastings, and D.J. Marsh, *Endocrinology*, **150**, 3101 (2009). (*Pharmacol.*)
7) M. Miyazato, K. Mori, T. Ida, M. Kojima, N. Murakami, and K. Kangawa, *Regul. Pept.*, **145**, 37 (2008). (*Review*)

Code	Compound			Price:Yen
4377-v -20℃	**Neuromedin U (Rat)** **NMU-23 (Rat)** Tyr-Lys-Val-Asn-Glu-Tyr-Gln-Gly-Pro-Val-Ala-Pro-Ser-Gly-Gly-Phe-Phe-Leu-Phe-Arg-Pro-Arg-Asn-NH_2 (M.W. 2643.0) $C_{124}H_{180}N_{34}O_{31}$ [117505-80-3] *Food Intake Suppressor*	Vial	0.5 mg	20,000

Neuromedin U (**NMU**), possessing uterus contractile activity, was first isolated from porcine spinal cord as NMU-8 and NMU-25[1,2]. Later, rat NMU was identified as a single entity, consisting of 23 amino acid residues (**NMU-23**) because of lack of the double basic site (Gly-Gly substitution for Arg-Arg). In addition to its role in smooth muscle contraction, **NMU** exerts some other biological activities such as increase of blood pressure, induction of ACTH release, etc. However, the specific receptor for **NMU** has long been unidentified. **NMU** itself is present in the brain as well as in the gut.

Applying the recently developed technique of using the so-called orphan G-protein coupled receptors, **NMU** has been reported to be a ligand of two structurally related receptors by several groups [reference 3 and *J. Biol. Chem.*, **275**, 20247 (2000), *ibid.*, 21068, *ibid.*, 29528]. One is expressed predominantly in peripheral tissue, while another is expressed in the CNS. It is especially interesting to note that in the rat brain, the second form is expressed in the paraventricular nucleus of the hypothalamus, suggesting **NMU** to be involved in the regulation of food intake. Actually, NMU mRNA is located abundantly in the ventromedial hypothalamic regions and its level is reduced in rats fasted for 48 h. When **NMU** is injected at a dose of 3 or 10 μg in rats, overnight food intake is significantly decreased and accordingly body weight is reduced[3,4]. Water intake was also found to be suppressed[3].

Taken together, **NMU** may be one of the physiological mediators of food intake and may be useful in clarifying the intricate mechanism of obesity and leanness.

1) J.M. Conlon, J. Domin, L. Thim, V. DiMarzo, H.R. Morris, and S.R. Bloom, *J. Neurochem.*, **51**, 988 (1988). (*Original; Primary Structure*)
2) N. Minamino, K. Kangawa, M. Honzawa, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **156**, 355 (1988). (*Original; Primary Structure*)
3) A.D. Howard, R. Wang, S.-S. Pong, T.N. Mellin, A. Strack, X.-M. Guan, Z. Zeng, D.L. Williams, Jr., S.D. Feighner, C.N. Nunes, B. Murphy, J.N. Stair, H. Yu, Q. Jiang, M.K. Clements, C.P. Tan, K.K. McKee, D.L. Hreniuk, T.P. McDonald, K.R. Lynch, J.F. Evans, C.P. Austin, C.T. Caskey, L.H.T. Van der Ploeg, and Q. Liu, *Nature*, **406**, 70 (2000). (*Pharmacol.*)
4) M. Nakazato, R. Hanada, N. Murakami, Y. Date, M.S. Mondal, M. Kojima, H. Yoshimatsu, K. Kangawa, and S. Matsukura, *Biochem. Biophys. Res. Commun.*, **277**, 191 (2000). (*Pharmacol.*)
5) P.J. Brighton, P.G. Szekeres, and G.B. Willars, *Pharmacol. Rev.*, **56**, 231 (2004). (*Review*)
6) A. Peier, J. Kosinski, K. Cox-York, Y. Qian, K. Desai, Y. Feng, P. Trivedi, N. Hastings, and D.J. Marsh, *Endocrinology*, **150**, 3101 (2009). (*Pharmacol.*)

Neuromedin K See Code 4317 **Neurokinin B** on page 101

Neuromedin L See Code 4154 **Neurokinin A** on page 101

NMU-23 (Rat) See Code 4377 **Neuromedin U (Rat)** 102

Neuronostatin

Code	Compound			Price:Yen
4452-v New -20℃	**Neuronostatin-13 (Human)** **(Chimpanzee, Porcine, Canine, Ovine, Bovine, Chicken)** Leu-Arg-Gln-Phe-Leu-Gln-Lys-Ser-Leu-Ala-Ala-Ala-Ala-NH_2 (M.W. 1415.7) $C_{64}H_{110}N_{20}O_{16}$	Vial	0.5 mg	8,000

Brain/Gut Hormone in Pro-Somatostatin with Neuronal/Neuroendocrine/Cardiovascular Activity

In the post-genome era, a novel peptide called **neuronostatin-13** has been predicted in pro-somatostatin gene sequence based on bioinformatics method. **Neuronostatin-13** was purified from porcine tissue by immuno-affinity procedure and then confirmed to be an endogenous peptide. Actually, **neuronostatin-13** is a 13 amino acid residue peptide with carboxyl-terminal amidation, the primary structure of which is conserved in human, chimpanzee and some other mammals.

The biological functions of **neuronostatin-13** reported so far include: **i)** intracerebroventricular administration of **neuronostatin-13** in rats increased blood pressure but suppressed food intake and water drinking (0.3 nmol per rat)[1], **ii)** in both brain and gastric cells, **neuronostatin-13** stimulates c-Fos expression and cell proliferation/migration[1], and **iii)** this peptide depresses cardiac contractile function[2]. Thus, **neuronostatin-13** might be a new member of brain/gut hormones. In addition, the function of **neuronostatin-13** is not mediated by somatostatin receptors. **Neuronostatin-13** with "*diverse neuronal, neuroendocrine, and cardiovascular actions*" could be of interest in the research field of hormonal regulation of the body.

1) 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.*)
2) Y. Hua, H. Ma, W.K. Samson, and J. Ren, *Am. J. Physiol. Regul. Integr. Comp. Physiol.*, **297**, 682 (2009). (*Pharmacol.*)

Neuropeptide B

Code	Compound			Price:Yen
4459-v New -20℃	**Neuropeptide B-29 (Rat) (Non-Brominated Form)** **NPB-29 (Rat) (Non-brominated)** 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 (M.W. 3188.5) $C_{147}H_{211}N_{43}O_{38}$ *Ligand of NPBWR1 (GPR7)*	Vial	0.5 mg	33,000

cDNA sequences encoding neuropeptide B (NPB) of several species were reported in 2002[1),2)]. Simultaneously, endogenous bovine NPB was identified to be a 29-residue peptide with a unique C-6-brominated Trp residue at its position 1[1),2)]. However, as far as we know, it has not been reported whether Trp at position 1 in rat NPB is brominated or not. In the mean time, there have been some papers evaluating the biological activity of rat non-brominated NPB in food intake [**Neuropeptide B-29 (Rat) (Non-Brominated Form)**] in which modulation of food intake in rat seems to be greatly modified by corticotropin-releasing factor [3)]. Very recently, a novel activity of **Neuropeptide B-29 (Rat) (Non-Brominated Form)** has been reported, that is, induction of slow wave sleep in mice when administered during the dark period (1 and 10 nmol / mice, i.c.v.) [4)]. This effect was abolished by either deletion of Trp at position 1 of NPB or knockout of neuropeptide B/W receptor-1 (NPBWR1, previously named GPR7) in mice.

Synthetic **Neuropeptide B-29 (Rat) (Non-Brominated Form)** might be a useful tool for elucidating the biological function of NPB regardless of the endogenous NPB being brominated or not.

1) 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*)
2) 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.*)
3) S. Aikawa, M. Ishii, M. Yanagisawa, Y. Sakakibara, and T. Sakurai, *Regul. Pept.*, **151**, 147 (2008). (*Pharmacol.; Food Intake Regulatory Activity*)
4) N. Hirashima, T. Tsunematsu, K. Ichiki, H. Tanaka, T.S. Kilduff, and A. Yamanaka, *Sleep*, in press. (*Pharmacol.; Slow Wave Sleep Induction Activity*)

Neuropeptide S

Code	Compound			Price:Yen
4425-v -20℃	**Neuropeptide S (Human)** **NPS (Human)** Ser-Phe-Arg-Asn-Gly-Val-Gly-Thr-Gly-Met- Lys-Lys-Thr-Ser-Phe-Gln-Arg-Ala-Lys-Ser (M.W. 2187.5) $C_{93}H_{155}N_{31}O_{28}S$ [412938-67-1]	Vial	0.5 mg	21,000

Novel Modulator of Arousal and Anxiety / Food Intake Suppressor

Arousal and anxiety-like behavior are regulated by several modulators in the central nervous system, including classical neurotransmitters (i.e. noradrenaline) and peptides (i.e. orexin). In a recent paper, a new peptide named **neuropeptide S** (**NPS**), has been identified as a novel modulator of wakefulness and anxiety[1].

Human **NPS** is a 20-amino acid peptide[1]. Four other mammalian **NPS**s and chicken **NPS** were deduced with high sequence similarity to human **NPS**.

Human:	SFRNGVGTGM KKTSFQRAKS
Chimpanzee:	SFRNGVGTGM KKTSF**R**RAKS
Dog:	SFRNGVGTGM KKTSF**R**RAKS
Rat:	SFRNGVG**S**G**V** KKTSF**R**RAK**Q**
Mouse:	SFRNGVG**S**G**A** KKTSF**R**RAK**Q**
Chicken:	SFRNGVG**S**G**I** KKTSF**R**RAKS

NPS-expressing neurons are uniquely localized in an unidentified cluster of cells between locus coeruleus and Barrington's nucleus in the rat brain. Human **NPS** induces mobilization of intracellular Ca^{2+} ions through the expressed human NPS receptor (ED_{50} = 9.4 nM). Synthetic **NPS** exerts the following functions upon i.c.v. administration: **i)** increased locomotor activity in mice (>0.1 nmol), **ii)** increased wakefulness in rats by reducing all sleep stages [REM, slow wave sleep stage 1 (SWS1), and SWS2] (>0.1 nmol), and **iii)** dose-dependent attenuation of anxiety-like behavior in mice. The exact mechanism is not yet understood and these functions might be mutually related through an arousal-promoting effect. Since **NPS** is produced by previously unidentified neurons in a brain stem region known for regulating anxiety and arousal, it is expected this novel peptide will help unravel the mechanism of sleep disorders and anxiety.

1) Y.-L. Xu, R.K. Reinscheid, S. Huitron-Resendiz, S.D. Clark, Z. Wang, S.H. Lin, F.A. Brucher, J. Zeng, N.K. Ly, S.J. Henriksen, L. de Lecea, and O. Civelli, *Neuron*, **43**, 487 (2004). (*Original*)
2) R.K. Reinscheid and Y.-L. Xu, *FEBS J.*, **272**, 5689 (2005). (*Minireview*)
3) B. Beck, B. Fernette, and A. Stricker-Krongrad, *Biochem. Biophys. Res. Commun.*, **332**, 859 (2005). (*Pharmacol.*)
4) K.L. Smith, M. Patterson, W.S. Dhillo, S.R. Patel, N.M. Semjonous, J.V. Gardiner, M.A. Ghatei, and S.R. Bloom, *Endocrinology*, **147**, 3510 (2006). (*Pharmacol.*)
5) A. Fedeli, S. Braconi, D. Economidou, N. Cannella, M. Kallupi, R. Guerrini, G. Calo, C. Cifani, M. Massi, and R. Ciccocioppo, *Eur. J. Neurosci.*, **30**, 1594 (2009). (*Pharmacol.*)

1) Y. Dumont, J.-C. Martel, A. Fournier, S. St-Pierre, and R. Quirion, *Progr. Neurobiol.*, **38**, 125 (1992). (*Review*)
2) C. Wahlestedt and D.J. Reis, *Annu. Rev. Pharmacol. Toxicol.*, **33**, 309 (1993). (Review)

Code	Compound			Price:Yen
4158-s -20℃	**NPY (Human, Rat)*** **Neuropeptide Y (Human, Rat)** Tyr-Pro-Ser-Lys-Pro-Asp-Asn-Pro-Gly-Glu-Asp-Ala-Pro-Ala-Glu-Asp-Met-Ala-Arg-Tyr-Tyr-Ser-Ala-Leu-Arg-His-Tyr-Ile-Asn-Leu-Ile-Thr-Arg-Gln-Arg-Tyr-NH_2 (M.W. 4271.7) $C_{189}H_{285}N_{55}O_{57}S$ [90880-35-6]	Vial	0.1 mg	12,000
4158-v -20℃	**NPY (Human, Rat)*** **Neuropeptide Y (Human, Rat)** Purity Information : QP See page IV (XVI) 1) C.D. Minth, S.R. Bloom, J.M. Polka, and J.E. Dixon, *Proc. Natl. Acad. Sci. U.S.A.*, **81**, 4577 (1984). (*Original; Human cDNA*) 2) D. Larhammer, A. Ericsson, and H. Persson, *Proc. Natl. Acad. Sci. U.S.A.*, **84**, 2068 (1987). (*Original; Rat Nucleotide Seq.*)	Vial	0.5 mg	41,000
4162-s -20℃	**NPY (Porcine, Bovine)*** **Neuropeptide Y (Porcine, Bovine)** Tyr-Pro-Ser-Lys-Pro-Asp-Asn-Pro-Gly-Glu-Asp-Ala-Pro-Ala-Glu-Asp-Leu-Ala-Arg-Tyr-Tyr-Ser-Ala-Leu-Arg-His-Tyr-Ile-Asn-Leu-Ile-Thr-Arg-Gln-Arg-Tyr-NH_2 (M.W. 4253.6) $C_{190}H_{287}N_{55}O_{57}$ [83589-17-7]	Vial	0.1 mg	12,000
4162-v -20℃	**NPY (Porcine, Bovine)*** **Neuropeptide Y (Porcine, Bovine)** Purity Information : QP See page IV (XVI) 1) K. Tatemoto, *Proc. Natl. Acad. Sci. U.S.A.*, **79**, 5485 (1982). (*Original*)	Vial	0.5 mg	41,000
4314-s -20℃	**[Leu^{31}, Pro^{34}]-NPY (Porcine)** **[Leu^{31}, Pro^{34}]-Neuropeptide Y (Porcine) (Bovine)** Tyr-Pro-Ser-Lys-Pro-Asp-Asn-Pro-Gly-Glu-Asp-Ala-Pro-Ala-Glu-Asp-Leu-Ala-Arg-Tyr-Tyr-Ser-Ala-Leu-Arg-His-Tyr-Ile-Asn-Leu-Leu-Thr-Arg-Pro-Arg-Tyr-NH_2 (M.W. 4222.6) $C_{190}H_{286}N_{54}O_{56}$ [125580-28-1] Purity Information : QP See page IV (XVI) *NPY Y_1-Receptor Selective Agonist* 1) J. Fuhlendorff, U. Gether, L. Aakerlund, N. Langeland-Johansen, H. Thøgersen, S.G. Melberg, U.B. Olsen, O. Thastrup, and T.W. Schwartz, *Proc. Natl. Acad. Sci. U.S.A.*, **87**, 182 (1990). (*Original*) 2) S.P. Sheikh, *Am. J. Physiol.*, **261**, G701 (1991). (*Pharmacol.*)	Vial	0.1 mg	12,000

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Neuropeptide Y (NPY) and Related Peptides (continued)

Code	Compound			Price:Yen
4315-s -20℃	**NPY (Porcine, 13-36)** **Neuropeptide Y (Porcine, 13-36)** **(Bovine)** Pro-Ala-Glu-Asp-Leu-Ala-Arg-Tyr-Tyr-Ser-Ala-Leu-Arg-His-Tyr-Ile-Asn-Leu-Ile-Thr-Arg-Gln-Arg-Tyr-NH_2 (M.W. 2982.4) $C_{135}H_{209}N_{41}O_{36}$ [113662-54-7] *NPY Y_2-Receptor Selective Agonist*	Vial	0.1 mg	6,000

1) M.W. Walker and R.J. Miller, *Mol. Pharmacol.*, **34**, 779 (1988). (*Pharmacol.*)
2) J. Fuhlendorff, U. Gether, L. Aakerlund, N. Langeland-Johansen, H. Thøgersen, S.G. Melberg, U.B. Olsen, O. Thastrup, and T.W. Schwartz, *Proc. Natl. Acad. Sci. U.S.A.*, **87**, 182 (1990). (*Pharmacol.*)
3) S.P. Sheikh, *Am. J. Physiol.*, **261**, G701 (1991). (*Pharmacol.*)

Neuropeptide W

4403-v -20℃	**Neuropeptide W-30 (Human)** **NPW30 (Human), hL8C** Trp-Tyr-Lys-His-Val-Ala-Ser-Pro-Arg-Tyr-His-Thr-Val-Gly-Arg-Ala-Ala-Gly-Leu-Leu-Met-Gly-Leu-Arg-Arg-Ser-Pro-Tyr-Leu-Trp (M.W. 3543.1) $C_{165}H_{249}N_{49}O_{37}S$ [383415-80-3] *Food Intake-Regulating Peptide / GPR7/GPR8 Ligand*	Vial	0.5 mg	33,000
4404-v -20℃	**Neuropeptide W-30 (Rat)** **NPW30 (Rat), rL8C** Trp-Tyr-Lys-His-Val-Ala-Ser-Pro-Arg-Tyr-His-Thr-Val-Gly-Arg-Ala-Ser-Gly-Leu-Leu-Met-Gly-Leu-Arg-Arg-Ser-Pro-Tyr-Leu-Trp (M.W. 3559.1) $C_{165}H_{249}N_{49}O_{38}S$ [383415-90-5] *Food Intake-Regulating Peptide / GPR7/GPR8 Ligand*	Vial	0.5 mg	33,000

A method based on "reverse pharmacology" has been successfully applied to identification of novel ligands for the orphan receptors. Three groups discovered identical ligands to GPR7 and GPR8, which were designated either "**neuropeptide W** (**NPW**)" or "L8C" [1,2,3] (in this brief introduction, "**NPW**" is used as the abbreviation of the discovered peptide).

Based on the isolated peptide from porcine hypothalamus, cDNA sequence of human and rat NPW were predicted. Human and rat **NPW** were deduced to be a 30- or 23-residue peptide [**NPW30** or NPW23 (corresponding to the amino-terminal 23 residues of **NPW30**)] because of the existence of the potential double basic cleaving sites in the precursor. Chemically synthesized **NPW30** (and also NPW23) showed: **i)** binding activity to both GPR7 and GPR8 at nM or even lower concentrations; **ii)** inhibitory activity of cAMP accumulation induced by forskolin; **iii)** stimulatory activity of prolactin release; and **iv)** stimulation of aggregation of melanosomes in melanophres. In addition to these, some roles in food intake regulation[4] are suggested to be in line with the predominant localization of its mRNA in the brain. Later, the implications for the control of stress hormone secretion by **NPW** was reported[5]. **NPW** should serve as an essential tool for understanding biological events originating from CNS activation or inhibition. In addition, the presence of **NPW** in gastric antral G cell, was reported[6]. This finding provides an interesting view for the regulation of gastric function by this novel brain/gut peptide.

Neuropeptide W (continued)

1) Y. Shimomura, M. Harada, M. Goto, T. Sugo, Y. Matsumoto, M. Abe, T. Watanabe, T. Asami, C. Kitada, M. Mori, H. Onda, and M. Fujino, *J. Biol. Chem.*, **277**, 35826 (2002). (*Original; NPW*)
2) S. Brezillon, V. Lannoy, J.-D. Franssen, E. Le Poul, V. Dupriez, J. Lucchetti, M. Detheux, and M. Parmentier, *J. Biol. Chem.*, **278**, 776 (2003). (*Original; L8C*)
3) 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). (*cDNA*)
4) M.S. Mondal, H. Yamaguchi, Y. Date, T. Shimbara, K. Toshinai, Y. Shimomura, M. Mori, and M. Nakazato, *Endocrinology*, *Endocrinology*, **144**, 4729 (2003). (*Pharmacol.)*
5) M.M. Taylor, E.A. Yuill, J.R. Baker, C.C. Ferri, A.V. Ferguson, and W.K. Samson, *Am. J. Physiol. Regul. Integr. Comp. Physiol.*, **288**, R270 (2005). (*Pharmacol.*)
6) M.S. Mondal, H. Yamaguchi, Y. Date, K. Toshinai, T. Kawagoe, T. Tsuruta, H. Kageyama, Y. Kawamura, S. Shioda, Y. Shimomura, M. Mori, and M. Nakazato, *J. Endocrinol.*, **188**, 49 (2006). (*Pharmacol. & Immunohistochem.*)
7) F. Takenoya, S. Kitamura,, H. Kageyama, N. Nonaka, M. Seki, K. Itabashi, Y. Date, M. Nakazato, and S. Shioda, *Regul. Pept.*, **145**, 159 (2008). (*Pharmacol.*)

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Neurotensin

Code	Compound			Price:Yen
4029-v -20℃	**Neurotensin** **(Human, Bovine, Canine, Mouse)** Pyr-Leu-Tyr-Glu-Asn-Lys-Pro-Arg-Arg-Pro-Tyr-Ile-Leu (M.W. 1672.9) $C_{78}H_{121}N_{21}O_{20}$ [55508-42-4]	Vial	0.5 mg	3,300
4029 -20℃	**Neurotensin** **(Human, Bovine, Canine, Mouse)** Pyr-Leu-Tyr-Glu-Asn-Lys-Pro-Arg-Arg-Pro-Tyr-Ile-Leu • 2AcOH • $6H_2O$ (M.W. 1672.9 • 120.10 • 108.09) $C_{78}H_{121}N_{21}O_{20}$ • $2CH_3COOH$ • $6H_2O$	Bulk	25 mg	50,000

1) R. Carraway and S.E. Leeman, *J. Biol. Chem.*, **248**, 6854 (1973). (*Original; Bovine*)
2) R.A. Hammer, S.E. Leeman, R. Carraway, and R.H. Williams, *J. Biol. Chem.*, **255**, 2476 (1980). (*Original; Human*)
3) P.R. Dobner, D.L. Barber, L. Villa-Komaroff, and C. McKiernan, *Proc. Natl. Acad. Sci. U.S.A.*, **84**, 3516 (1987). (*cDNA Seq.; Canine*)
4) P.R. Dobner, J. Fadel, N. Deitemeyer, R.E. Carraway, and A.Y. Deutch, *Proc. Natl. Acad. Sci. U.S.A.*, **98**, 8048 (2001). (*cDNA Seq.; Mouse*)

Neurotoxin NSTX-3

Code	Compound			Price:Yen
4195-s -20℃	**Neurotoxin NSTX-3** **(Papua New Guinean Spider, *Nephila maculata*)** 2,4-Dihydroxyphenylacetyl-L-asparaginyl-N^{ω}-(L-arginylputreanyl)-cadaverine (M.W. 664.80) $C_{30}H_{52}N_{10}O_7$	Vial	0.1 mg	9,000

1) Y. Aramaki, T. Yasuhara, T. Higashijima, M. Yoshioka, A. Miwa, N. Kawai, and T. Nakajima, *Proc. Jpn. Acad.*, **62 (B)**, 359 (1986). (*Original*)
2) T. Teshima, T. Wakamiya, Y. Aramaki, T. Nakajima, N. Kawai, and T. Shiba, *Tetrahedron Lett.*, **28**, 3509 (1987). (*Chem. Synthesis; Preliminary*)
3) T. Teshima, T. Matsumoto, T. Wakamiya, T. Shiba, Y. Aramaki, T. Nakajima, and N. Kawai, *Tetrahedron*, **47**, 3305 (1991). (*Chem. Synthesis; Total Synthesis*)

Nitric Oxide Synthase Inhibitor See Code 2005 **Arg(NO_2)** on page 301

Nociceptin

Code	Compound			Price:Yen
4318-v -20℃	**Nociceptin (Human)** **Orphanin FQ (Human)** **(Rat, Mouse, Bovine, Porcine)** Phe-Gly-Gly-Phe-Thr-Gly-Ala-Arg-Lys-Ser- Ala-Arg-Lys-Leu-Ala-Asn-Gln (M.W. 1809.0) $C_{79}H_{129}N_{27}O_{22}$ [170713-75-4]	Vial	0.5 mg	15,000

Agonist of Opioid Receptor-Like-1 (ORL1) Receptor

1) J.-C. Meunier, C. Mollereau, L. Toll, C. Suaudeau, C. Moisand, P. Alvinerie, J.-L. Butour, J.-C. Guillemot, P. Ferrara, B. Monsarrat, H. Mazarguil, G. Vassart, M. Parmentier, and J. Costentin, *Nature*, **377**, 532 (1995). (*Original; Nociceptin-ORL1 Receptor Agonist*)
2) R.K. Reinscheid, H.-P. Nothacker, A. Bourson, A. Ardati, R.A. Henningsen, J.R. Bunzow, D.K. Grandy, H. Langen, F.J. Monsma, Jr., and O. Civelli, *Science*, **270**, 792 (1995). (*Original; Orphanin FQ*)
3) C. Mollereau, M.-J. Simons, P. Soularue, F. Liners, G. Vassart, J.-C. Meunier, and M. Parmentier, *Proc. Natl. Acad. Sci. U.S.A.*, **93**, 8666 (1996). (*Original; Human, Rat, & Mouse Nociceptin-Nucleotide Seq.*)
4) J.C. Meunier, *Eur. J. Pharmacol.*, **340**, 1 (1997). (*Review*)
5) G. Csaba and K. Tekes, *Brain Dev.*, **27**, 465 (2005). (*Review*)
6) Z.S. Zadori, N. Shujaa, L. Koeles, K.P. Kiraly, K. Tekes, and K. Gyires, *Peptides*, **29**, 2257 (2008). (*Pharmacol.*)

Primary structures of human, bovine, mouse, and rat Nociceptin and Nocistatin precursor

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Human   MKVLLCDLLL LSLFSSVFSS CQRDCLTCQE KLHPALDSFD LEVCILECEE KVFPSPLWTP  60
Bovine  MKILFCDLLL LSLFSSVSSS CQKDCLVCRE KLRPTLDSFS LEMCILECEE KAFTSPLWTP  60
Mouse   MKILFCDVLL LSLLSSVFSS CPRDCLTCQE KLHPAPDSFN LKTCILQCEE KVFPRPLWTV  60
Rat     MKILFCDVLL LSLLSSVFSS CPEDCLTCQE RLHPAPGSFN LKLCILQCEE KVFPRPLWTL  60

                                                    Nocistatin
Human   CTKVMARSSW QLSPAAPEHV AAALYQPRAS EMQHLRRMPR VRSLFQEQ-- ---------E 109
Bovine  CTKVMARGSW QLSPADPDHV AAALDQPRAS EMQHLKRMPR VRSLFQRQ-- ---------K 109
Mouse   CTKVMASGSG QLSPADPELV SAALYQPKAS EMQHLKRMPR VRSLVQVRDA EPGADAEPGA 120
Rat     CTKAMASDSE QLSPADPELT SAALYQSKAS EMQHLKRMPR VRSVVQARDA EPEA------ 114

                                  Nociceptin
Human   EPEPGMEEAG EMEQKQLQKR FGGFTGARKS ARKLANQKRF SEFMRQYLVL SMQSSQRRRT 169
                Nocistatin
Bovine  RTEPGLEEVG EIEQKQLQKR FGGFTGARKS ARKLANQKRF SEFMRQYLVL SMQSSQRRRT 169
Mouse   DAEPGADDAE EVEQKQLQKR FGGFTGARKS ARKLANQKRF SEFMRQYLVL SMQSSQRRRT 180
Rat     DAEPVADEAD EVEQKQLQKR FGGFTGARKS ARKLANQKRF SEFMRQYLVL SMQSSQRRRT 174

Human   LHQNGNV  176
Bovine  LHQNGNA  176
Mouse   LHQNGNV  187
Rat     LHQNGNV  181
```

1) G. Csaba and K. Tekes, *Brain Dev.*, **27**, 465 (2005). (*Review*)

Code	Compound			Price:Yen
4355-v -20℃	**Nocistatin (Human)** Met-Pro-Arg-Val-Arg-Ser-Leu-Phe-Gln-Glu-Gln-Glu-Glu-Pro-Glu-Pro-Gly-Met-Glu-Glu-Ala-Gly-Glu-Met-Glu-Gln-Lys-Gln-Leu-Gln (M.W. 3561.9) $C_{149}H_{238}N_{42}O_{53}S_3$ *Endogenous Allodynia / Hyperalgesia-Blocking Peptide* *Nociceptin Action Blocking Peptide*	Vial	0.5 mg	30,000

1) T. Minami, E. Okuda-Ashitaka, Y. Nishiuchi, T. Kimura, S. Tachibana, H. Mori, and S. Ito, *Br. J. Pharmacol.*, **124**, 1016 (1998). (*Original; Pharmacol.*)
2) C. Mollereau, M.-J. Simons, P. Soularue, F. Liners, G. Vassart, J.-C. Meunier, and M. Parmentier, *Proc. Natl. Acad. Sci. U.S.A.*, **93**, 8666 (1996). (*Original; Prepronociceptin Nucleotide Seq.*)
3) T.-L. Lee, F.M.Y. Fung, F.-G. Chen, N. Chou, E. Okuda-Ashitaka, S. Ito, Y. Nishiuchi, T. Kimura, and S. Tachibana, *NeuroReport*, **10**,1537 (1999). (*Original; Identification in Human*)
4) Z.S. Zadori, N. Shujaa, L. Koeles, K.P. Kiraly, K. Tekes, and K. Gyires, *Peptides*, **29**, 2257 (2008). (*Pharmacol.*)

4336-v -20℃	**Nocistatin (Bovine)** (Ammonium Form) Thr-Glu-Pro-Gly-Leu-Glu-Glu-Val-Gly-Glu-Ile-Glu-Gln-Lys-Gln-Leu-Gln (M.W. 1927.1) $C_{82}H_{135}N_{21}O_{32}$ *Endogenous Allodynia / Hyperalgesia-Blocking Peptide* *Nociceptin Action Blocking Peptide*	Vial	0.5 mg	20,000

1) E. Okuda-Ashitaka, T. Minami, S. Tachibana, Y. Yoshihara, Y. Nishiuchi, T. Kimura, and S. Ito, *Nature*, **392**, 286 (1998). (*Original*)
2) B. Nicol, D.J. Lambert, D.J. Rowbothan, E. Okuda-Ashitaka, S. Ito, D. Smart, and A.T. McKnight, *Eur. J. Pharmacol.*, **356**, R1 (1998). (*Pharmacol.*)
3) T. Nakagawa, M. Kaneko, S. Inamura, and M. Satoh, *Neurosci. Lett.*, **265**, 64 (1999). (*Pharmacol.*)
4) H. Nakano, T. Minami, K. Abe, T. Arai, M. Tokumura, N. Ibii, E. Okuda-Ashitaka, H. Mori , and S. Ito, *J. Pharmacol. Exp. Ther.*, **292**, 331 (2000). (*Pharmacol.*)
5) M. Fantin, C. Fischetti, C. Trapella, and M. Morari, *Br. J. Pharmacol.*, **152**, 549 (2007). (*Pharmacol.*)

NPW30 (Human) See Code 4403 **Neuropeptide W-30 (Human)** on page 109

NPW30 (Rat) See Code 4404 **Neuropeptide W-30 (Rat)** on page 109

Obestatins

Code	Compound			Price:Yen
4429-s -20℃	**Obestatin (Human)** Phe-Asn-Ala-Pro-Phe-Asp-Val-Gly-Ile-Lys-Leu-Ser-Gly-Val-Gln-Tyr-Gln-Gln-His-Ser-Gln-Ala-Leu-NH_2 (M.W. 2546.8) $C_{116}H_{176}N_{32}O_{33}$ *Food Intake Suppressor*	Vial	0.1 mg	8,000
4430-s -20℃	**Obestatin (Rat, Mouse)** Phe-Asn-Ala-Pro-Phe-Asp-Val-Gly-Ile-Lys-Leu-Ser-Gly-Ala-Gln-Tyr-Gln-Gln-His-Gly-Arg-Ala-Leu-NH_2 (M.W. 2516.8) $C_{114}H_{174}N_{34}O_{31}$ *Food Intake Suppressor*	Vial	0.1 mg	8,000

Multifunctional peptide, ghrelin (code 4372-s and 4373-s), was discovered by Kojima *et al.* in 1999, and its precursor sequence was also clarified in the same report[1]. A group at Stanford University School of Medicine found a novel peptide named "**obestatin**" in the preproghrelin sequence by using a bioinformatic prediction method they developed to analyze preproghrelin[2]. This group also identified peptides such as stresscopin / stresscopin-related peptide (Code 4387-s and 4388-s) and intermedin (also called adrenomedullin 2, Code 4421-s and 4422-s) by using the same method.

Ghrelin Precursor (Human)

Ghrelin

MPSPGTVCSL LLLGMLWLDL AMAGSSFLSP EHQRVQQRKE SKKPPAKLQP RALAGWLRPE
DGGQAEGAED ELEVRFNAPF DVGIKLSGVQ YQQHSQALGK FLQDILWEEA KEAPADK

Obestatin (precursor)

Obestatin was predicted to be a 23-residue peptide with carboxyl-terminal amide functionality, which is flanked by mono basic residues in the preproghrelin sequence in the form of a Gly-extended structure. Endogenous **obestatin** was then isolated from rat stomach extracts, by which their prediction was confirmed to be correct. **Obestatin** is conserved in the preproghrelin sequences of 11 different mammalian species, including human.

Synthetic **obestatin** is reported to suppress food intake in mice which is very interesting because this effect is opposed to that of ghrelin. It is also reported that **obestatin** exerts the opposite effects to the role of ghrelin in the gastric emptying activity as well as the contractile activity in the jejunum. Thus, in contrast to ghrelin, **obestatin** may be an anorexic peptide leading to body weight loss.

1) M. Kojima, H. Hosoda, Y. Date, M. Nakazato, H. Matsuo, and K. Kangawa, *Nature*, **402**, 656 (1999). (*Original; Preproghrelin*)
2) J.V. Zhang, P.-G. Ren, O. Avsian-Kretchmer, C.-W. Luo, R. Rauch, C. Klein, and A.J.W. Hsueh, *Science*, **310**, 996 (2005). (*Original; Structure & Pharmacol.*)
3) S.-Q. Tang, Q.-Y. Jiang, Y.-L. Zhang, X.-T. Zhu, G. Shu, P. Gao, D.-Y. Feng, X.-Q. Wang, and X.-Y. Dong, *Peptides*, **29**, 639 (2008). (*Review*)
4) J.-B. Soares and A.F. Leite-Moreira, *Peptides*, **29**, 1255 (2008). (*Review*)
5) A.-J. Ren, Z.-F. Guo, Y.-K. Wang, L. Lin, X. Zheng, and W.-J. Yuan, *Peptides*, **30**, 439 (2009). (*Review*)

Opioid Peptides

List of Opioid Peptides

	Code	Compound	Quantity	Price: Yen	Page
Methionine-Enkephalin Containing Peptides					
	4042-v	**Methionine-Enkephalin★**	0.5 mg vial	2,100	63
	4116-v	**[D-Ala^2,Met^5]-Enkephalin★**	0.5 mg vial	2,400	64
	4117-v	**[D-Ala^2,Met^5]-Enkephalinamide**	0.5 mg vial	2,400	64
	4119-v	**BAM-12P**	0.5 mg vial	6,600	24
	4055-v	**α-Endorphin**	0.5 mg vial	9,500	58
	4060-v	**β-Endorphin (Human)**	0.5 mg vial	17,000	58
	4089-v	**γ-Endorphin**	0.5 mg vial	11,500	58
Leucine-Enkephalin Containing Peptides					
	4043-v	**Leucine-Enkephalin★**	0.5 mg vial	2,100	63
	4118-v	**Leucine-Enkephalin (Sulfated Form)**	0.5 mg vial	4,600	63
	4115-v	**[D-Ala^2,D-Leu^5]-Enkephalin★**	0.5 mg vial	2,400	64
	4090-v	**α-Neo-Endorphin (Porcine)**	0.5 mg vial	6,600	100
	4091-v	**β-Neo-Endorphin (Porcine)**	0.5 mg vial	6,600	100
	4080-v	**Dynorphin A (Human, 1-13)**	0.5 mg vial	6,600	56
	4108-v	**Dynorphin A (Human)**	0.5 mg vial	12,500	56
Others					
	4079-v	**β-Casomorphin-5 (Bovine)★**	0.5 mg vial	2,100	33
	4078-v	**β-Casomorphin-7 (Bovine)**	0.5 mg vial	2,700	34
	4333-v	**Endomorphin-1★**	0.5 mg vial	2,100	57
	4334-v	**Endomorphin-2★**	0.5 mg vial	2,100	58
	4318-v	**Nociceptin (Human)**	0.5 mg vial	15,000	111

★ Other bulk packaging is available.

Orexins

1) T. Sakurai, *Regul. Pept.*, **85**, 25 (1999). (*Review*)
2) J.M. Siegel, *Cell*, **98**, 409 (1999). (*Review*)
3) L. De Lecea and J.G. Sutcliffe, *Cell. Mol. Life Sci.*, **56**, 473 (1999). (*Review*)
4) R.J. Rodgers, Y. Ishii, J.C.G. Halford, and J.E. Blundell, *Neuropeptides*, **36**, 303 (2002). (*Review*)
5) N. Tsujino and T. Sakurai, *Pharmacol. Rev.*, **61**, 162 (2009). (*Review*)
6) M. Mieda and T. Sakurai, *CNS Neurol. Disord. Drug Targets*, **8**, 281 (2009). (*Review*)
7) B.C. Baccari, *Curr. Protein Pept. Sci.*, **11**, 148 (2010). (*Review*)

Code	Compound			Price:Yen
4346-s	**Orexin-A (Human)**	Vial	0.1 mg	20,000

-20℃

(Rat, Mouse, Bovine)

Pyr-Pro-Leu-Pro-Asp-Cys-Cys-Arg-Gln-Lys-Thr-Cys-Ser-Cys-Arg-Leu-Tyr-Glu-Leu-Leu-His-Gly-Ala-Gly-Asn-His-Ala-Ala-Gly-Ile-Leu-Thr-Leu-NH_2

(Disulfide bonds between Cys^6-Cys^{12} and Cys^7-Cys^{14})

(M.W. 3561.1) $C_{152}H_{243}N_{47}O_{44}S_4$ [205640-90-0]

Appetite-Boosting Peptide / Sleep-Wakefulness State Regulator

1) T. Sakurai, A. Amemiya, M. Ishii, I. Matsuzaki, R.M. Chemelli, H. Tanaka, S.C. Williams, J.A. Richardson, G.P. Kozlowski, S. Wilson, J.R.S. Arch, R.E. Buckingham, A.C. Haynes, S.A. Carr, R.S. Annan, D.E. McNulty, W.-S. Liu, J.A. Terrett, N.A. Elshourbagy, D.J. Bergsma, and M. Yanagisawa, *Cell*, **92**, 573 (1998). (*Original*)
2) L. de Lecea, T.S. Kilduff, C. Peyron, X.-B. Gao, P.E. Foye, P.E. Danielson, C. Fukuhara, E.L.F. Battenberg, V.T. Gautvik, F.S. Bartlett II, W.N. Frankel, A.N. van den Pol, F.E. Bloom, K.M. Gautvik, and J.G. Sutcliffe, *Proc. Natl. Acad. Sci. U.S.A.*, **95**, 322 (1998). (*cDNA; Same Sequence [Hypocretin]*)
3) N. Takahashi, T. Okumura, H. Yamada, and Y. Kohgo, *Biochem. Biophys. Res. Commun.*, **254**, 623 (1999). (*Pharmacol.*)
4) T. Ida, K. Nakahara, T. Murakami, R. Hanada, M. Nakazato, and N. Murakami, *Biochem. Biophys. Res. Commun.*, **270**, 318 (2000). (*Pharmacol.*)

Code	Compound			Price:Yen
4348-s -20℃	**Orexin-B (Human)** Arg-Ser-Gly-Pro-Pro-Gly-Leu-Gln-Gly-Arg- Leu-Gln-Arg-Leu-Leu-Gln-Ala-Ser-Gly-Asn- His-Ala-Ala-Gly-Ile-Leu-Thr-Met-NH_2 (M.W. 2899.3) $C_{123}H_{212}N_{44}O_{35}S$ [205640-91-1]	Vial	0.1 mg	10,000

Appetite-Boosting Peptide / Sleep-Wakefulness State Regulator

1) T. Sakurai, A. Amemiya, M. Ishii, I. Matsuzaki, R.M. Chemelli, H. Tanaka, S.C. Williams, J.A. Richardson, G.P. Kozlowski, S. Wilson, J.R.S. Arch, R.E. Buckingham, A.C. Haynes, S.A. Carr, R.S. Annan, D.E. McNulty, W.-S. Liu, J.A. Terrett, N.A. Elshourbagy, D.J. Bergsma, and M. Yanagisawa, *Cell*, **92**, 573 (1998). (*Original*)
2) L. de Lecea, T.S. Kilduff, C. Peyron, X.-B. Gao, P.E. Foye, P.E. Danielson, C. Fukuhara, E.L.F. Battenberg, V.T. Gautvik, F.S. Bartlett II, W.N. Frankel, A.N. van den Pol, F.E. Bloom, K.M. Gautvik, and J.G. Sutcliffe, *Proc. Natl. Acad. Sci. U.S.A.*, **95**, 322 (1998). (*cDNA; Same Sequence [Hypocretin]*)
3) N. Takahashi, T. Okumura, H. Yamada, and Y. Kohgo, *Biochem. Biophys. Res. Commun.*, **254**, 623 (1999). (*Pharmacol.*)

Code	Compound			Price:Yen
4347-s -20℃	**Orexin-B (Rat, Mouse)** **Hypocretin 2 (Rat, Mouse)** Arg-Pro-Gly-Pro-Pro-Gly-Leu-Gln-Gly-Arg- Leu-Gln-Arg-Leu-Leu-Gln-Ala-Asn-Gly-Asn- His-Ala-Ala-Gly-Ile-Leu-Thr-Met-NH_2 (M.W. 2936.4) $C_{126}H_{215}N_{45}O_{34}S$ [202801-92-1] Purity Information: QP See page IV (XVI)	Vial	0.1 mg	10,000

Appetite-Boosting Peptide / Sleep-Wakefulness State Regulator

1) T. Sakurai, A. Amemiya, M. Ishii, I. Matsuzaki, R.M. Chemelli, H. Tanaka, S.C. Williams, J.A. Richardson, G.P. Kozlowski, S. Wilson, J.R.S. Arch, R.E. Buckingham, A.C. Haynes, S.A. Carr, R.S. Annan, D.E. McNulty, W.-S. Liu, J.A. Terrett, N.A. Elshourbagy, D.J. Bergsma, and M. Yanagisawa, *Cell*, **92**, 573 (1998). (*Original*)
2) L. de Lecea, T.S. Kilduff, C. Peyron, X.-B. Gao, P.E. Foye, P.E. Danielson, C. Fukuhara, E.L.F. Battenberg, V.T. Gautvik, F.S. Bartlett II, W.N. Frankel, A.N. van den Pol, F.E. Bloom, K.M. Gautvik, and J.G. Sutcliffe, *Proc. Natl. Acad. Sci. U.S.A.*, **95**, 322 (1998). (*cDNA; Same Sequence [Hypocretin]*)
3) N. Takahashi, T. Okumura, H. Yamada, and Y. Kohgo, *Biochem. Biophys. Res. Commun.*, **254**, 623 (1999). (*Pharmacol.*)
4) M.S. Mondal, M. Nakazato, Y. Date, N. Murakami, M. Yanagisawa, and S. Matsukura, *Biochem. Biophys. Res. Commun.*, **256**, 495 (1999). (*Distribution*)

Primary structures of human, rat and mouse Orexin-A and -B precursor

```
                                                          Orexin-A
Human   MNLPSTKVSW AAVTLLLLLL LLPPALLSSG AAAQPLPDCC RQKTCSCRLY ELLHGAGNHA 60
Rat     MNLPSTKVPW AAVTLLLLLL L-PPALLSLG VDAQPLPDCC RQKTCSCRLY ELLHGAGNHA 59
Mouse   MNFPSTKVPW AAVTLLLLLL L-PPALLSLG VDAQPLPDCC RQKTCSCRLY ELLHGAGNHA 59

                                  Orexin-B
Human   AGILTLGKRR SGPPGLQGRL QRLLQASGNH AAGILTMGRR AGAEPAPRPC LGRRCSAPAA 120
Rat     AGILTLGKRR PGPPGLQGRL QRLLQANGNH AAGILTMGRR AGAELEPYPC PGRRCPTATA 119
Mouse   AGILTLGKRR PGPPGLQGRL QRLLQANGNH AAGILTMGRR AGAELEPHPC SGRGCPTVTT 119

Human   ASVAPGGQSG I 131
Rat     TALAPRGGSR V 130
Mouse   TALAPRGGSG V 130
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Orphanin FQ (Human) See Code 4318 **Nociceptin (Human)** on page 111

Osteocalcins

Code	Compound			Price:Yen
4262-s -20℃	**Gla^{17,21,24}-Osteocalcin (Human)** **Osteocalcin (Human, Gla^{17,21,24})** (Ammonium Form) Tyr-Leu-Tyr-Gln-Trp-Leu-Gly-Ala-Pro-Val-Pro-Tyr-Pro-Asp-Pro-Leu-Gla-Pro-Arg-Arg-Gla-Val-Cys-Gla-Leu-Asn-Pro-Asp-Cys-Asp-Glu-Leu-Ala-Asp-His-Ile-Gly-Phe-Gln-Glu-Ala-Tyr-Arg-Arg-Phe-Tyr-Gly-Pro-Val (Gla: L-γ-Carboxyglutamic acid) (Disulfide bond between Cys^{23}-Cys^{29}) (M.W. 5929.4) $C_{269}H_{381}N_{67}O_{82}S_2$ [136461-80-8] Purity Information : QX See page IV (XVI)	Vial	0.1 mg	inquiry

Bone Gla Protein

1) J.W. Poser, F.S. Esch, N.C. Ling, and P.A. Price, *J. Biol. Chem.*, **255**, 8685 (1980). (*Original*)
2) M. Nakao, Y. Nishiuchi, M. Nakata, T. Kimura, and S. Sakakibara, *Pept. Res.*, **7**, 171 (1994). (*Chem. Synthesis*)
3) P.V. Hauschka, J.B. Lian, D.E.C. Cole, and C.M. Gundberg, *Physiol. Rev.*, **69**, 990 (1989). (*Review*)

Code	Compound			Price:Yen
4261-s -20℃	**Glu^{17},Gla^{21,24}-Osteocalcin (Human)** **Osteocalcin (Human, Glu^{17}, Gla^{21,24})** (Ammonium Form) Tyr-Leu-Tyr-Gln-Trp-Leu-Gly-Ala-Pro-Val-Pro-Tyr-Pro-Asp-Pro-Leu-Glu-Pro-Arg-Arg-Gla-Val-Cys-Gla-Leu-Asn-Pro-Asp-Cys-Asp-Glu-Leu-Ala-Asp-His-Ile-Gly-Phe-Gln-Glu-Ala-Tyr-Arg-Arg-Phe-Tyr-Gly-Pro-Val (Gla: L-γ-Carboxyglutamic acid) (Disulfide bond between Cys^{23}-Cys^{29}) (M.W. 5885.4) $C_{268}H_{381}N_{67}O_{80}S_2$ Purity Information : QX See page IV (XVI)	Vial	0.1 mg	inquiry

Bone Gla Protein

1) J.W. Poser, F.S. Esch, N.C. Ling, and P.A. Price, *J. Biol. Chem.*, **255**, 8685 (1980). (*Original*)
2) M. Nakao, Y. Nishiuchi, M. Nakata, T. Kimura, and S. Sakakibara, *Pept. Res.*, **7**, 171 (1994). (*Chem. Synthesis*)
3) P.V. Hauschka, J.B. Lian, D.E.C. Cole, and C.M. Gundberg, *Physiol. Rev.*, **69**, 990 (1989). (*Review*)

Oxytocins

1) B. Berde (ed.), Neurohypophysial Hormones and Similar Polypeptides, *Handbook of Experimental Pharmacology*, **Vol. 23**, Springer-Verlag, Berlin, 1968. (*Review*)

Code	Compound			Price:Yen
4084-v -20℃	**Oxytocin***	Vial	0.5 mg	3,800

(Human, Porcine, Bovine, Rat, Ovine)
Cys-Tyr-Ile-Gln-Asn-Cys-Pro-Leu-Gly-NH_2
(Disulfide bond between Cys^1-Cys^6)
(M.W. 1007.2) $C_{43}H_{66}N_{12}O_{12}S_2$ [50-56-6]

1) V. Du Vigneaud, C. Ressler, and S. Trippett, *J. Biol. Chem.*, **205**, 949 (1953). (*Original*)
2) R.A. Boissonnas, St. Guttmann, P.-A. Jaquenoud, and J.-P. Waller, *Helv. Chim. Acta*, **38**, 1491 (1955). (*Chem. Synthesis*)
3) M. Zaoral and J. Rudinger, *Collection Czech. Chem. Commun.*, **20**, 1183 (1955). (*Chem. Synthesis*)
4) A. Light and V. Du Vigneaud, *Proc. Soc. Exp. Biol. Med.*, **98**, 692 (1958). (*Original; Human*)

4025-v -20℃	**[$Asu^{1,6}$]-Oxytocin***	Vial	0.5 mg	4,800

Deamino-Dicarba-Oxytocin
cyclo(Tyr-Ile-Gln-Asn-Asu)-Pro-Leu-Gly-NH_2
(Asu: L-α-Aminosuberic acid)
(Cyclic form between Asu ω-carboxyl group and Tyr α-amino group)
(M.W. 956.10) $C_{45}H_{69}N_{11}O_{12}$ [14317-68-1]

1) T. Yamanaka, S. Hase, S. Sakakibara, I.L. Schwartz, B.M. Dubois, and R. Walter, *Mol. Pharmacol.*, **6**, 474 (1970). (*Original*)

PACAP See **Pituitary Adenylate Cyclase Activating Polypeptides** on page 125

PAMP (Human) See Code 4291 **Proadrenomedullin N-terminal 20 Peptide (Human)** on page 5

PAMP (Rat) See Code 4292 **Proadrenomedullin N-terminal 20 Peptide (Rat)** on page 5

PAMP-12 (Human) See Code 4339 **Proadrenomedullin N-terminal 20 Peptide (Human, 9-20)** on page 5

Pancreastatins

4214-v -20℃	**Chromogranin A (Human, 286-301 Amide)**	Vial	0.5 mg	11,500

(Hydrochloride Form)
Glu-Glu-Glu-Glu-Glu-Met-Ala-Val-Val-Pro-Gln-Gly-Leu-Phe-Arg-Gly-NH_2
(M.W. 1819.0) $C_{78}H_{123}N_{21}O_{27}S$ [133605-57-9]
Purity Information : QE See page IV (XVI)

1) D.S. Konecki, U.M. Benedum, H.H. Gerdes, and W.B. Huttner, *J. Biol. Chem.*, **262**, 17026 (1987). (*Original; cDNA*)

4186-v -20℃	**[Pyr^{33}]-Pancreastatin (Porcine, 33-49)**	Vial	0.5 mg	11,500

Pyr-Glu-Glu-Glu-Glu-Glu-Thr-Ala-Gly-Ala-Pro-Gln-Gly-Leu-Phe-Arg-Gly-NH_2
(M.W. 1829.9) $C_{77}H_{116}N_{22}O_{30}$

1) K. Tatemoto, S. Efendic, V. Mutt, G. Makk, G.J. Feistner, and J.D. Barchas, *Nature*, **324**, 476 (1986). (*Original*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

List of Parathyroid Hormone (PTH) and Related Peptides

Species	Code	Compound	Quantity	Price: Yen	Page
Human					
	4134-v	**PTH (1-84)**	20 µg vial	20,000	below
	4068-s	**PTH (1-34)**	0.1 mg vial	8,000	below
	4068-v	**PTH (1-34)**	0.5 mg vial	27,000	below
	4324-v	**PTH (1-31 Amide)**	0.5 mg vial	30,000	119
	4094-v	**PTH (1-44)**	0.5 mg vial	41,000	119
	4106-v	**PTH (13-34)**	0.5 mg vial	22,000	119
	4124-v	**PTH (39-68)**	0.5 mg vial	36,000	119
	4169-v	**PTH (39-84)**	0.5 mg vial	41,000	120
	4170-v	**PTH (69-84)**	0.5 mg vial	12,500	120
	4129-v	**[Nle^{8,18}, Tyr^{34}]-PTH (1-34)**	0.5 mg vial	37,000	120
	4180-v	**[Nle^{8,18}, Tyr^{34}]-PTH (1-34 Amide)**	0.5 mg vial	36,000	120
	4181-v	**[Nle^{8,18}, Tyr^{34}]-PTH (3-34 Amide)**	0.5 mg vial	36,000	121
Bovine					
	4179-v	**[Tyr^{34}]-PTH (1-34 Amide)**	0.5 mg vial	36,000	121
	4185-v	**[Tyr^{34}]-PTH (7-34 Amide)**	0.5 mg vial	36,000	121

Code	Compound			Price:Yen
4134-v -20℃	**Parathyroid Hormone (Human, 1-84)** **PTH (Human, 1-84)** Ser-Val-Ser-Glu-Ile-Gln-Leu-Met-His-Asn-Leu-Gly-Lys-His-Leu-Asn-Ser-Met-Glu-Arg-Val-Glu-Trp-Leu-Arg-Lys-Lys-Leu-Gln-Asp-Val-His-Asn-Phe-Val-Ala-Leu-Gly-Ala-Pro-Leu-Ala-Pro-Arg-Asp-Ala-Gly-Ser-Gln-Arg-Pro-Arg-Lys-Lys-Glu-Asp-Asn-Val-Leu-Val-Glu-Ser-His-Glu-Lys-Ser-Leu-Gly-Glu-Ala-Asp-Lys-Ala-Asp-Val-Asn-Val-Leu-Thr-Lys-Ala-Lys-Ser-Gln (M.W. 9424.6) $C_{408}H_{674}N_{126}O_{126}S_2$ [68893-82-3] 1) G.N. Hendy, H.M. Kronenberg, J.T. Potts, Jr., and A. Rich, *Proc. Natl. Acad. Sci. U.S.A.*, **78**, 7365 (1981). (*Original; cDNA Seq.*) 2) T. Kimura, M. Takai, K. Yoshizawa, and S. Sakakibara, *Biochem. Biophys. Res. Commun.*, **114**, 493 (1983). (*Chem. Synthesis*) 3) H. Takasu, H. Baba, N. Inomata, Y. Uchiyama, N. Kubota, K. Kumaki, A. Matsumoto, K. Nakajima, T. Kimura, S. Sakakibara, T. Fujita, K. Chihara, and I. Nagai, *Endocrinology*, **137**, 5537 (1996). (*Pharmacol.*)	Vial	20 µg	20,000
4068-s -20℃	**Parathyroid Hormone (Human, 1-34)** **PTH (Human, 1-34)** Ser-Val-Ser-Glu-Ile-Gln-Leu-Met-His-Asn-Leu-Gly-Lys-His-Leu-Asn-Ser-Met-Glu-Arg-Val-Glu-Trp-Leu-Arg-Lys-Lys-Leu-Gln-Asp-Val-His-Asn-Phe (M.W. 4117.7) $C_{181}H_{291}N_{55}O_{51}S_2$ [52232-67-4]	Vial	0.1 mg	8,000
4068-v -20℃	**Parathyroid Hormone (Human, 1-34)** **PTH (Human, 1-34)** 1) M. Takai, Y. Kurano, T. Kimura, and S. Sakakibara, *Peptide Chemistry 1979*, 187 (1980). (*Chem. Synthesis*)	Vial	0.5 mg	27,000

Code	Compound			Price:Yen
4324-v -20℃	**Parathyroid Hormone (Human, 1-31 Amide)** **PTH (Human, 1-31 Amide)** Ser-Val-Ser-Glu-Ile-Gln-Leu-Met-His-Asn-Leu-Gly-Lys-His-Leu-Asn-Ser-Met-Glu-Arg-Val-Glu-Trp-Leu-Arg-Lys-Lys-Leu-Gln-Asp-Val-NH_2 (M.W. 3718.3) $C_{162}H_{270}N_{50}O_{46}S_2$ *Adenylate Cyclase- / Bone Growth-Stimulating Peptide*	Vial	0.5 mg	30,000

1) R.H. Rixon, J.F. Whitfield, L. Gagnon, R.J. Isaacs, S. Maclean, B. Chakravarthy, J.P. Durkin, W. Neugebauer, V. Ross, W. Sung, and G.E. Willick, *J. Bone Miner. Res.*, **9**, 1179 (1994). (*Original*)
2) W. Neugebauer, J.-R. Barbier, W.L. Sung, J.F. Whitfield, and G.E. Willick, *Biochemistry*, **34**, 8835 (1995). (*Biochem.*)
3) J.F. Whitfield and P. Morley, *Trends Pharmacol. Sci.*, **16**, 382 (1995). (*Review*)
4) J.F. Whitfield, P. Morley, G.E. Willick, V. Ross, J.R. Barbier, R.J. Isaacs, and L. Ohannessian-Barry, *Calcif. Tissue Int.*, **58**, 81 (1996). (*Pharmacol.*)

4094-v -20℃	**Parathyroid Hormone (Human, 1-44)** **PTH (Human, 1-44)** Ser-Val-Ser-Glu-Ile-Gln-Leu-Met-His-Asn-Leu-Gly-Lys-His-Leu-Asn-Ser-Met-Glu-Arg-Val-Glu-Trp-Leu-Arg-Lys-Lys-Leu-Gln-Asp-Val-His-Asn-Phe-Val-Ala-Leu-Gly-Ala-Pro-Leu-Ala-Pro-Arg (M.W. 5063.9) $C_{225}H_{366}N_{68}O_{61}S_2$ [85568-24-7] Purity Information : Qx See page IV (XVI)	Vial	0.5 mg	41,000

1) T. Kimura, M. Takai, Y. Masui, T. Morikawa, and S. Sakakibara, *Biopolymers*, **20**, 1823 (1981). (*Chem. Synthesis*)

4106-v -20℃	**Parathyroid Hormone (Human, 13-34)** **PTH (Human, 13-34)** Lys-His-Leu-Asn-Ser-Met-Glu-Arg-Val-Glu-Trp-Leu-Arg-Lys-Lys-Leu-Gln-Asp-Val-His-Asn-Phe (M.W. 2808.2) $C_{125}H_{199}N_{39}O_{33}S$ [81306-64-1]	Vial	0.5 mg	22,000

1) R. Nakamura, H. Sokabe, T. Kimura, and S. Sakakibara, *Endocrinol. Jpn.*, **28**, 547 (1981). (*Pharmacol.; Hypotension*)
2) K. Sakaguchi, M. Fukase, I. Kobayashi, T. Kimura, S. Sakakibara, S. Katsuragi, K. Morita, T. Noda, and T. Fujita, *J. Bone Miner. Res.*, **2**, 83 (1987). (*Pharmacol.*)

4124-v -20℃	**Parathyroid Hormone (Human, 39-68)** **PTH (Human, 39-68)** (Hydrochloride Form) Ala-Pro-Leu-Ala-Pro-Arg-Asp-Ala-Gly-Ser-Gln-Arg-Pro-Arg-Lys-Lys-Glu-Asp-Asn-Val-Leu-Val-Glu-Ser-His-Glu-Lys-Ser-Leu-Gly (M.W. 3285.6) $C_{139}H_{234}N_{46}O_{46}$ Purity Information : Qx See page IV (XVI)	Vial	0.5 mg	36,000

1) P. D'Amour, F. Labelle, R. Wolde-Giorghis, and L. Hamel, *J. Immunoass.*, **10**, 191 (1989). (*Radioimmunoassay*)
2) T. Yamaguchi, M. Arao, and M. Fukase, *Acta Endocrinol.*, **127**, 267 (1992). (*Biochem.; PTH Degradation*)
3) T. Yamaguchi, M. Fukase, H. Kido, T. Sugimoto, N. Katunuma, and K. Chihara, *Life Sci.*, **54**, 381 (1994). (*Biochem.; PTH Degradation*)

Code	Compound			Price:Yen
4169-v -20℃	**Parathyroid Hormone (Human, 39-84)** **PTH (Human, 39-84)** Ala-Pro-Leu-Ala-Pro-Arg-Asp-Ala-Gly-Ser-Gln-Arg-Pro-Arg-Lys-Lys-Glu-Asp-Asn-Val-Leu-Val-Glu-Ser-His-Glu-Lys-Ser-Leu-Gly-Glu-Ala-Asp-Lys-Ala-Asp-Val-Asn-Val-Leu-Thr-Lys-Ala-Lys-Ser-Gln (M.W. 4984.5) $C_{211}H_{357}N_{67}O_{72}$ [90880-43-6] 1) P. D'Amour, F. Labelle, R. Wolde-Giorghis, and L. Hamel, *J. Immunoass.*, **10**, 191 (1989). (*Biochem.; Presence in Circuration*) 2) T. Yamaguchi, M. Arao, and M. Fukase, *Acta Endocrinol.*, **127**, 267 (1992). (*Biochem.; PTH Degradation*) 3) T. Yamaguchi, M. Fukase, H. Kido, T. Sugimoto, N. Katunuma, and K. Chihara, *Life Sci.*, **54**, 381 (1994). (*Biochem.; PTH Degradation*)	Vial	0.5 mg	41,000
4170-v -20℃	**Parathyroid Hormone (Human, 69-84)** **PTH (Human, 69-84)** (Hydrochloride Form) Glu-Ala-Asp-Lys-Ala-Asp-Val-Asn-Val-Leu-Thr-Lys-Ala-Lys-Ser-Gln (M.W. 1716.9) $C_{72}H_{125}N_{21}O_{27}$ Purity Information : QE See page IV (XVI) 1) P. D'Amour, F. Labelle, R. Wolde-Giorghis, and L. Hamel, *J. Immunoass.*, **10**, 191 (1989). (*Radioimmunoassay*) 2) H. Takasu, H. Baba, N. Inomata, Y. Uchiyama, N. Kubota, K. Kumaki, A. Matsumoto, K. Nakajima, T. Kimura, S. Sakakibara, T. Fujita, K. Chihara, and I. Nagai, *Endocrinology*, **137**, 5537 (1996). (*Pharmacol.*)	Vial	0.5 mg	12,500
4129-v -20℃	**[Nle^{8,18}, Tyr^{34}]-Parathyroid Hormone (Human, 1-34)** **[Nle^{8,18}, Tyr^{34}]-PTH (Human, 1-34)** Ser-Val-Ser-Glu-Ile-Gln-Leu-Nle-His-Asn-Leu-Gly-Lys-His-Leu-Asn-Ser-Nle-Glu-Arg-Val-Glu-Trp-Leu-Arg-Lys-Lys-Leu-Gln-Asp-Val-His-Asn-Tyr (Nle: L-Norleucine) (M.W. 4097.6) $C_{183}H_{295}N_{55}O_{52}$ 1) T. Noda, S. Katsuragi, and S. Watanabe, *The 41st Annual Meeting of Chemical Society of Japan*, Osaka, April 1980, Abstr. No.4S12. (*Original*)	Vial	0.5 mg	37,000
4180-v -20℃	**[Nle^{8,18}, Tyr^{34}]-Parathyroid Hormone (Human, 1-34 Amide)** **[Nle^{8,18}, Tyr^{34}]-PTH (Human, 1-34 Amide)** Ser-Val-Ser-Glu-Ile-Gln-Leu-Nle-His-Asn-Leu-Gly-Lys-His-Leu-Asn-Ser-Nle-Glu-Arg-Val-Glu-Trp-Leu-Arg-Lys-Lys-Leu-Gln-Asp-Val-His-Asn-Tyr-NH_2 (Nle: L-Norleucine) (M.W. 4096.7) $C_{183}H_{296}N_{56}O_{51}$ 1) M. Rosenblatt, D. Goltzman, H.T. Keutmann, G.W. Tregear, and J.T. Potts, Jr., *J. Biol. Chem.*, **251**, 159 (1976). (*Chem. Synthesis & Biological Activity*) 2) M.L. Thomas and L.R. Forte, *Comp. Biochem. Physiol.*, **73A**, 691 (1982). (*Biological Activity*) 3) I. Yamamoto, C. Shigeno, J.T. Potts, Jr., and G.V. Segre, *Endocrinology*, **122**, 1208 (1988). (*Radioimmunoassay*)	Vial	0.5 mg	36,000

Parathyroid Hormone (PTH) and Related Peptides (continued)

Code	Compound			Price:Yen
4181-v -20℃	**[Nle^{8,18},Tyr^{34}]-Parathyroid Hormone (Human, 3-34 Amide)** **[Nle^{8,18},Tyr^{34}]-PTH (Human, 3-34 Amide)** Ser-Glu-Ile-Gln-Leu-Nle-His-Asn-Leu-Gly-Lys-His-Leu-Asn-Ser-Nle-Glu-Arg-Val-Glu-Trp-Leu-Arg-Lys-Lys-Leu-Gln-Asp-Val-His-Asn-Tyr-NH_2 (Nle: L-Norleucine) (M.W. 3910.4) $C_{175}H_{282}N_{54}O_{48}$ 1) S.R. Goldring, J.E. Mahaffey, M. Rosenblatt, J.-M. Dayer, J.T. Potts, Jr., and S.M. Krane, *J. Endocrinol. Metab.*, **48**, 655 (1979). (*Pharmacol.*) 2) T.C. Chen, M. Rosenblatt, and J.B. Puschett, *Biochem. Biophys. Res. Commun.*, **94**, 1227 (1980). (*Pharmacol.*) 3) D.A. Gray, J.A. Parsons, J.T. Potts, Jr., M. Rosenblatt, and R.W. Stevenson, *Br. J. Pharmacol.*, **76**, 259 (1982). (*Pharmacol.*)	Vial	0.5 mg	36,000
4179-v -20℃	**[Tyr^{34}]-Parathyroid Hormone (Bovine, 1-34 Amide)** **[Tyr^{34}]-PTH (Bovine, 1-34 Amide)** Ala-Val-Ser-Glu-Ile-Gln-Phe-Met-His-Asn-Leu-Gly-Lys-His-Leu-Ser-Ser-Met-Glu-Arg-Val-Glu-Trp-Leu-Arg-Lys-Lys-Leu-Gln-Asp-Val-His-Asn-Tyr-NH_2 (M.W. 4123.7) $C_{183}H_{289}N_{55}O_{50}S_2$ 1) M. Rosenblatt, *Pathobiol. Annu.*, **11**, 53 (1981). (*Review*)	Vial	0.5 mg	36,000
4185-v -20℃	**[Tyr^{34}]-Parathyroid Hormone (Bovine, 7-34 Amide)** **[Tyr^{34}]-PTH (Bovine, 7-34 Amide)** Phe-Met-His-Asn-Leu-Gly-Lys-His-Leu-Ser-Ser-Met-Glu-Arg-Val-Glu-Trp-Leu-Arg-Lys-Lys-Leu-Gln-Asp-Val-His-Asn-Tyr-NH_2 (M.W. 3496.0) $C_{156}H_{244}N_{48}O_{40}S_2$ [86292-93-5] *PTH Antagonist* 1) N. Horiuchi, M.F. Holick, J.T. Potts, Jr., and M. Rosenblatt, *Science*, **220**, 1053 (1983). (*Original*)	Vial	0.5 mg	36,000

Parathyroid Hormone Related Proteins (PTH-rP)

Code	Compound			Price:Yen
4205-v -20℃	**PTH-rP (Human, 1-34 Amide)** **Parathyroid Hormone Related Protein (Human, 1-34 Amide) (Rat, Mouse)** Ala-Val-Ser-Glu-His-Gln-Leu-Leu-His-Asp-Lys-Gly-Lys-Ser-Ile-Gln-Asp-Leu-Arg-Arg-Arg-Phe-Phe-Leu-His-His-Leu-Ile-Ala-Glu-Ile-His-Thr-Ala-NH_2 (M.W. 4016.6) $C_{180}H_{288}N_{58}O_{47}$ [112955-31-4] 1) L.J. Suva, G.A. Winslow, R.E.H. Wettenhall, R.G. Hammonds, J.M. Moseley, H. Diefenbach-Jagger, C.P. Rodda, B.E. Kemp, H. Rodriguez, E.Y. Chen, P.J. Hudson, T.J. Martin, and W.I. Wood, *Science*, **237**, 893 (1987). (*Original; cDNA*) 2) N. Horiuchi, M.P. Caulfield, J.E. Fisher, M.E. Goldman, R.L. McKee, J.E. Reagan, J.J. Levy, R.F. Nutt, S.B. Rodan, T.L. Schofield, T.L. Clemens, and M. Rosenblatt, *Science*, **238**, 1566 (1987). (*Pharmacol.; Synthetic PTH-rP Amide*) 3) B.E. Kemp, J.M. Moseley, C.P. Rodda, P.R. Ebeling, R.E.H. Wettenhall, D. Stapleton, H. Diefenbach-Jagger, F. Ure, V.P. Michelangeli, H.A. Simmons, L.G. Raisz, and T.J. Martin, *Science*, **238**, 1568 (1987). (*Pharmacol.; Synthetic PTH-rP Amide*)	Vial	0.5 mg	31,000

Parathyroid Hormone Related Proteins (PTH-rP) (continued)

Code	Compound			Price:Yen
4215-v -20℃	**PTH-rP (Human, 7-34 Amide)** **Parathyroid Hormone Related Protein (Human, 7-34 Amide)** Leu-Leu-His-Asp-Lys-Gly-Lys-Ser-Ile-Gln- Asp-Leu-Arg-Arg-Arg-Phe-Phe-Leu-His-His- Leu-Ile-Ala-Glu-Ile-His-Thr-Ala-NH_2 (M.W. 3364.9) $C_{153}H_{247}N_{49}O_{37}$ [115695-30-2] *PTH-rP Antagonist*	Vial	0.5 mg	31,000

1) K. Nagasaki, K. Yamaguchi, Y. Miyake, C. Hayashi, S. Honda, K. Urakami, K. Miki, S. Kimura, T. Watanabe, and K. Abe, *Biochem. Biophys. Res. Commun.*, **158**, 1036 (1989). (*Original*)
2) L.J. Suva, G.A. Winslow, R.E.H. Wettenhall, R.G. Hammonds, J.M. Moseley, H. Diefenbach-Jagger, C.P. Rodda, B.E. Kemp, H. Rodriguez, E.Y. Chen, P.J. Hudson, T.J. Martin, and W.I. Wood, *Science*, **237**, 893 (1987). (*Original; cDNA*)

Peptide 234

Code	Compound			Price:Yen
4460-v New -20℃	**Peptide 234** Ac-D-Ala-Asn-Trp-Asn-Gly-Phe-Gly-D-Trp-Arg-Phe-NH_2 (M.W. 1295.4) $C_{63}H_{78}N_{18}O_{13}$ *Synthetic Kisspeptin Antagonist*	Vial	0.5 mg	7,200

Reproduction is one of the major fields of research using GPR-54 agonist, kisspeptin/metastin (Code 4446-s and 4447-s), and its shorter active fragment (Code 4389-v and 4453-v). **Peptide 234**, an antagonist of kisspeptin/metastin in reproduction, was discovered from rigorous structure-activity relationship studies of human Kisspeptin-10 (Human) / Metastin (Human, 45-52) (Code 4389-v), which is an amino acid substituted analog of the parental peptide at positions 1, 5 and 8[1]. **Peptide 234** is a potent agonist *in vitro* and *in vivo*: **i)** inhibition of kisspeptin-10-stimulated inositol phosphate (IC_{50} = 7 nM)[1], **ii)** blocking the kisspeptin-10 induced gonadotropin-releasing hormone (GnRH) neuron firing[1], **iii)** inhibition of kisspeptin-10 stimulated LH in intact male rats[1], **iv)** suppression of GnRH pulse and mean GnRH level (10 nM)[1], and **v)** suppression of LH in castrated male mice and ovariectomized 17β-estradiol-replaced rats as well as LH pulse in ovariectomized ewes[1),2)]. Central infusion of **peptide 234** to pubertal females delayed vaginal opening and decreased uterine and ovarian weights at the expected time of puberty, without affecting body weight. Likewise, chronic intracerebroventricular administration of **peptide 234** for 4 days prevented the preovulatory surges of LH and FSH[3)].

Peptide 234 should be a requisite tool to clarify the GPR-54-kisspeptin signaling in reproduction.

1) 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.*)
2) 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.*)
3) R. Pineda, D. Garcia-Galiano, A. Roseweir, M. Romero, M.A. Sanchez-Garrido, F. Ruiz-Pino, K. Morgan, L. Pinilla, R.P. Millar, and M. Tena-Sempere, *Endocrinology*, **151**, 722 (2010). (*Pharmacol.*)

Peptide Histidine-Methionine (PHM)

Code	Compound			Price:Yen
4177-v -20℃	**PHM-27 (Human)** **Peptide Histidine-Methionine** His-Ala-Asp-Gly-Val-Phe-Thr-Ser-Asp-Phe-Ser-Lys-Leu-Leu-Gly-Gln-Leu-Ser-Ala-Lys-Lys-Tyr-Leu-Glu-Ser-Leu-Met-NH_2 (M.W. 2985.4) $C_{135}H_{214}N_{34}O_{40}S$ [87403-73-4] 1) N. Itoh, K. Obata, N. Yanaihara, and H. Okamoto, *Nature*, **304**, 547 (1983). (*Original*)	Vial	0.5 mg	33,000

Peptide T

Code	Compound			Price:Yen
4188-v -20℃	**Peptide T** Ala-Ser-Thr-Thr-Thr-Asn-Tyr-Thr (M.W. 857.86) $C_{35}H_{55}N_9O_{16}$	Vial	0.5 mg	3,000
4188 -20℃	**Peptide T** Ala-Ser-Thr-Thr-Thr-Asn-Tyr-Thr • $4H_2O$ (M.W. 857.86 • 72.06) $C_{35}H_{55}N_9O_{16}$ • $4H_2O$ 1) C.B. Pert, J.M. Hill, M.R. Ruff, R.M. Berman, W.G. Robey, L.O. Arthur, F.W. Ruscetti, and W.L. Farrar, *Proc. Natl. Acad. Sci. U.S.A.*, **83**, 9254 (1986). (*Original*) 2) M.R. Ruff, B.M. Martin, E.I. Ginns, W.L. Farrar, and C.B. Pert, *FEBS Lett.*, **211**, 17 (1987). (*Pharmacol.*)	Bulk	25 mg	53,000

Peptide with Reversed Sequence of Amyloid β-Protein (Human, 1-40)

See Code 4413 **Amyloid β-Protein (40-1)** on page 14

Peptide with Reversed Sequence of Amyloid β-Protein (Human, 1-42)

See Code 4420 **Amyloid β-Protein (42-1)** on page 14

1) H. Ueno, H. Yamaguchi, M. Mizuta, and M. Nakazato, *Regul. Pept.*, **145**, 12 (2008). (*Review*)
2) M.T. Neary and R.L. Batterham, *Physiol. Behav.*, **97**, 616 (2009). (*Review*)

Code	Compound			Price:Yen
4400-v -20℃	**Peptide YY (Human, 3-36)** **PYY (Human, 3-36)** Ile-Lys-Pro-Glu-Ala-Pro-Gly-Glu-Asp-Ala-Ser-Pro-Glu-Glu-Leu-Asn-Arg-Tyr-Tyr-Ala-Ser-Leu-Arg-His-Tyr-Leu-Asn-Leu-Val-Thr-Arg-Gln-Arg-Tyr-NH_2 (M.W. 4049.5) $C_{180}H_{279}N_{53}O_{54}$	Vial	0.5 mg	39,000

Physiological Inhibitor for Food Intake / NPY Y_2-Receptor Agonist

Food intake is regulated by many peptides and proteins, and the majority of orexigenic and anorectic effects elicited by these factors are mediated through their action within the brain. However, the origin of these peptidic factors is not necessarily in the brain. For example, the major producing organ of ghrelin [Code 4372-s (human) and Code 4373-s (rat)] is the stomach. Later, **peptide YY (3-36)** [**PYY (3-36)**] was designated as a new member of this family of satiety peptides[1].

PYY (3-36) is a gut-derived endogenous peptide[2], which is secreted postprandially. When **PYY (3-36)** was injected peripherally in rats in a dose of 0.3 μg per 100 g (body weight), its plasma concentration increased to the normal postprandial range and food intake was significantly suppressed[1]. Direct central administration of this peptide into the arcuate nucleus also inhibited food consumption. **PYY (3-36)** is a well-known agonist for NPY Y_2 receptor (Y_2R)[3, 4]. Although the Y_2R was not thought to be significantly involved in NPY-induced food intake, a report in 2002 clarified its importance in body weight regulation[5]. Interestingly, no feeding inhibition by **PYY (3-36)** was detected in a Y_2R-deficient mouse. Furthermore, the anorectic effect of **PYY (3-36)** was seen in humans upon infusion (0.8 pmol per kg per min) for 90 min: food intake suppression by 33% was observed in the 24 h period★. The role of the vagal nerve in peripheral **PYY (3-36)** induced feeding reduction has been reported[6]. The functions of **PYY (3-36)**, especially through a Y_2R-dependent mechanism, should shed light on the ongoing question of body weight control.

★ Please note: All the peptides in this catalog including **PYY (3-36)** are not for human consumption.

1) R.L. Batterham, M.A. Cowley, C.J. Small, H. Herzog, M.A. Cohen, C.L. Dakin, A.M. Wren, A.E. Brynes, M.J. Low, M.A. Ghatei, R.D. Cone, and S.R. Bloom, *Nature*, **418**, 650 (2002). (*Original; Inhibition of Food Intake*)
2) G.A. Eberlein, V.E. Eysselein, M. Schaeffer, P. Layer, D. Grandt, H. Goebell, W. Niebel, M. Davis, T.D. Lee, J.E. Shively, and J.R. Reeve, Jr., *Peptides*, **10**, 797 (1989). (*Original; Endogenous Form*)
3) D.A. Keire, P. Mannon, M. Kobayashi, J.H. Walsh, T.E. Solomon, and J.R. Reeve, Jr., *Am. J. Physiol. Gastrointest. Liver Physiol.*, **279**, G126 (2000). (*Original; Y_2R Selectivity*)
4) S. Chamorro, O. Della-Zuana, J.-L. Fauchère, M. Félétou, J.-P. Galizzi, and N. Levens, *Int. J. Obes.*, **26**, 281 (2002). (*Review; Y_2R Selectivity*)
5) A. Sainsbury, C. Schwarzer, M. Couzens, S. Fetissov, S. Furtinger, A. Jenkins, H.M. Cox, G. Sperk, T Hökfelt, and H. Herzog, *Proc. Natl. Acad. Sci. U.S.A.*, **99**, 8938 (2002). (*Pharmacol.; Food intake Regulation through Y_2R*)
6) S. Koda, Y. Date, N. Murakami, T. Shimbara, T. Hanada, K. Toshinai, A. Niijima, M. Furuya, N. Inomata, K. Osuye, and M. Nakazato, *Endocrinology*, **146**, 2369 (2005). (*Physiol.; Role of Vagal Nerve*)
7) E.E. Ladenheim, *Am. J. Physiol. Rgul. Integr. Comp. Physiol.*, **293**, R37 (2007). (*Review*)
8) D. Boey, A. Sainsbury, and H. Herzog, *Peptides*, **28**, 390 (2007). (*Review*)

Physalaemin

Code	Compound			Price:Yen
4030-v -20℃	**Physalaemin*** **(Frog, *Physalaemus fuscumaculatus*)** Pyr-Ala-Asp-Pro-Asn-Lys-Phe-Tyr-Gly-Leu-Met-NH_2 (M.W. 1265.4) $C_{58}H_{84}N_{14}O_{16}S$ [2507-24-6]	Vial	0.5 mg	3,300
4030 -20℃	**Physalaemin*** **(Frog, *Physalaemus fuscumaculatus*)** Pyr-Ala-Asp-Pro-Asn-Lys-Phe-Tyr-Gly-Leu-Met-NH_2 • AcOH • $3H_2O$ (M.W. 1265.4 • 60.05 • 54.06) $C_{58}H_{84}N_{14}O_{16}S$ • CH_3COOH • $3H_2O$	Bulk	25 mg	49,000

1) V. Erspamer, A. Anastasi, G. Bertaccini, and J.M. Cei, *Experientia*, **20**, 489 (1964). (*Original*)
2) L. Bernardi, G. Bosisio, O. Goffredo, and R. de Castiglione, *Experientia*, **20**, 490 (1964). (*Chem. Synthesis*)

Pituitary Adenylate Cyclase Activating Polypeptides (PACAP)

1) A. Arimura, *Peptides*, **28**, 1617 (2007). (*Review*)
2) J. Watanabe, T. Nakamachi, R. Matsuno, D. Hayashi, M. Nakamura, S. Kikuyama, S. Nakajo, and S. Shioda, *Peptides*, **28**, 1713 (2007). (*Review*)
3) M. Nakata and T. Yada, *Curr. Pharm. Des.*, **13**, 1105 (2007). (*Review*)
4) D. Vaudry, A. Falluel-Morel, S. Bourgault, M. Basille, D. Burel, O. Wurtz, A. Fournier, B.K. Chow, H. Hashimoto, L. Galas, and H. Vaudry, *Pharmacol. Rev.*, **61**, 283 (2009). (*Review*)

4221-v -20℃	**PACAP38 (Human)*** **Pituitary Adenylate Cyclase Activating Polypeptide 38 (Human) (Ovine, Rat, Mouse)** His-Ser-Asp-Gly-Ile-Phe-Thr-Asp-Ser-Tyr-Ser-Arg-Tyr-Arg-Lys-Gln-Met-Ala-Val-Lys-Lys-Tyr-Leu-Ala-Ala-Val-Leu-Gly-Lys-Arg-Tyr-Lys-Gln-Arg-Val-Lys-Asn-Lys-NH_2 (M.W. 4534.3) $C_{203}H_{331}N_{63}O_{53}S$	Vial	0.5 mg	32,000

1) A. Miyata, A. Arimura, R.R. Dahl, N. Minamino, A. Uehara, L. Jiang, M.D. Culler, and D.H. Coy, *Biochem. Biophys. Res. Commun.*, **164**, 567 (1989). (*Original*)
- This compound is distributed through Peptide Institute, Inc. under the license of Tulane University.

4231-v -20℃	**PACAP27 (Human, 1-27 Amide)*** **Pituitary Adenylate Cyclase Activating Polypeptide 27 (Human, 1-27 Amide) (Ovine, Rat, Mouse)** His-Ser-Asp-Gly-Ile-Phe-Thr-Asp-Ser-Tyr-Ser-Arg-Tyr-Arg-Lys-Gln-Met-Ala-Val-Lys-Lys-Tyr-Leu-Ala-Ala-Val-Leu-NH_2 (M.W. 3147.6) $C_{142}H_{224}N_{40}O_{39}S$ [127317-03-7]	Vial	0.5 mg	22,000

1) A. Miyata, L. Jiang, R.R. Dahl, C. Kitada, K. Kubo, M. Fujino, N. Minamino, and A. Arimura, *Biochem. Biophys. Res. Commun.*, **170**, 643 (1990). (*Original*)
2) C. Kimura, S. Ohkubo, K. Ogi, M. Hosoya, Y. Itoh, H. Onda, A. Miyata, L. Jiang, R.R. Dahl, H.H. Stibbs, A. Arimura, and M. Fujino, *Biochem. Biophys. Res. Commun.*, **166**, 81 (1990). (*Original; Human & Ovine cDNA*)
3) K. Ogi, C. Kimura, H. Onda, A. Arimura, and M. Fujino, *Biochem. Biophys. Res. Commun.*, **173**, 1271 (1990). (*Original; Rat cDNA*)
4) K. Okazaki, Y. Itoh, K. Ogi, S. Ohkubo, and H. Onda, *Peptides*, **16**, 1295 (1995). (*Original; Mouse cDNA*)
- This compound is distributed through Peptide Institute, Inc. under the license of Tulane University.

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Pituitary Adenylate Cyclase Activating Polypeptides (PACAP) (continued)

Code	Compound			Price:Yen
4286-v -20℃	**PACAP (Human, 6-38)** **Pituitary Adenylate Cyclase Activating Polypeptide (Human, 6-38) (Ovine, Rat)** Phe-Thr-Asp-Ser-Tyr-Ser-Arg-Tyr-Arg-Lys-Gln-Met-Ala-Val-Lys-Lys-Tyr-Leu-Ala-Ala-Val-Leu-Gly-Lys-Arg-Tyr-Lys-Gln-Arg-Val-Lys-Asn-Lys-NH_2 (M.W. 4024.7) $C_{182}H_{300}N_{56}O_{45}S$ [143748-18-9] *PACAP Selective Antagonist*	Vial	0.5 mg	32,000

1) P. Robberecht, P. Gourlet, P. De Neef, M.C. Woussen-Colle, M.C. Vandermeers-Piret, A. Vandermeers, and J. Christophe, *Eur. J. Biochem.*, **207**, 239 (1992). (*Original*)
2) A. Vandermeers, S. Vandenborre, X. Hou, P. De Neef, P. Robberecht, M-C. Vandermeers-Piret, and J. Christophe, *Eur. J. Biochem.*, **208**, 815 (1992). (*Pharmacol.*)

Platelet Factor-4 Related Peptide

Code	Compound			Price:Yen
4305-v -20℃	**Platelet Factor-4 (Human, 58-70)** Pro-Leu-Tyr-Lys-Lys-Ile-Ile-Lys-Lys-Leu-Leu-Glu-Ser (M.W. 1573.0) $C_{76}H_{133}N_{17}O_{18}$ [82989-21-7] *Angiogenesis Inhibitor*	Vial	0.5 mg	4,000

1) T.E. Maione, G.S. Gray, J. Petro, A.J. Hunt, A.L. Donner, S.I. Bauer, H.F. Carson, and R.J. Sharpe, *Science*, **247**, 77 (1990). (*Original*)

Plectasin

Code	Compound			Price:Yen
4432-s -20℃	**Plectasin** **(Fungus, *Pseudoplectania nigrella*)** Gly-Phe-Gly-Cys-Asn-Gly-Pro-Trp-Asp-Glu- Asp-Asp-Met-Gln-Cys-His-Asn-His-Cys-Lys- Ser-Ile-Lys-Gly-Tyr-Lys-Gly-Gly-Tyr-Cys- Ala-Lys-Gly-Gly-Phe-Val-Cys-Lys-Cys-Tyr (Disulfide bonds between Cys^4-Cys^{30}, Cys^{15}-Cys^{37}, and Cys^{19}-Cys^{39}) (M.W. 4401.9) $C_{189}H_{267}N_{53}O_{56}S_7$ *Antimicrobial Peptide*	Vial	0.1 mg	23,000

Defensin peptides are essential members of host-defense antimicrobial peptides found in both vertebrates and invertebrates. Many defensins of invertebrate, as well as higher plants, have been discovered as the Cys-rich peptide having the disulfide arrangement of the cystine–stabilized α-β tertiary structures, which is a different characteristic structure from that of vertebrate peptides such as α- and β-defensins. A new member of the CSH motif family of peptides, termed **plectasin**, was isolated from a fungus *Pseudoplectania nigrella* for the first time[1].

Plectasin kills several species of Gram-positive bacteria including clinical isolates of *Stereptococcus pneumoniae*, whereas Gram-negative bacteria are resistant to it. The bactericidal activity of **plectasin** shows slower kinetics, suggesting that an alternative mechanism should be considered to explain its activity. In two mouse models *in vivo*, **plectasin** (10 mg/kg) exerts anti-infective activity against *S. pneumoniae* as effective as vancomycin in the peritoneal infection model and as effective as penicillin in the pneumonia model. Considering **plectasin** has neither cytotoxicity nor hemolytic activity to mammalian cells, this peptide may be a novel antimicrobial peptide useful for studying the host-defense mechanism against invaders. Recently, an inoffensive antibiotic effect of **plectasin** has reported. **Plectasin** showed no cytotoxicity to A549 cells, normal epithelial cells, or lung fibroblasts, and it did not induce IL-8 production[2].

1) P.H. Mygind, R.L. Fischer, K.M. Schnorr, M.T. Hansen, C.P. Sönksen, S. Ludvigsen, D. Raventós, S. Buskov, B. Christensen, L. De Maria, O. Taboureau, D. Yaver, S.G. Elvig-Jørgensen, M.V. Sørensen, B.E. Christensen, S. Kjærulff, N. Frimodt-Moller, R.I. Lehrer, M. Zasloff, and H.-H. Kristensen, *Nature*, **437**, 975 (2005). (*Original; Structure & Antimicrobial Activity*)
2) S. Hara, H. Mukae, N. Sakamoto, H. Ishimoto, M. Amenomori, H. Fujita, Y. Ishimatsu, K. Yanagihara, S. Kohno, *Biochem. Biophys. Res. Commun.*, **374**, 709 (2008). (*Pharmacol.*)
3) K. Mandal, B.L. Pentelute, V. Tereshko, V. Thammavongsa, O. Schneewind, A.A. Kossiakoff, and S.B.H. Kent, *Protein Sci.*, **18**, 1146 (2009). (*X-ray Structure*)
4) T. Schneider, T. Kruse, R. Wimmer, I. Wiedemann, V. Sass, U. Pag, A. Jansen, A.K. Nielsen, P.H. Mygind, D.S. Raventos, S. Neve, B. Ravn, A.M. Bonvin, L. De Maria, A.S. Andersen, L.K. Gammelgaard, H.G. Sahl, and H.H. Kristensen, *Science*, **328**, 1168 (2010). (*Pharmacol.*)

Pleiotrophin

Code	Compound			Price:Yen
4335-v	**Pleiotrophin (Human)**	Vial	50 µg	30,000
-20℃	**PTN (Human)**			

Gly-Lys-Lys-Glu-Lys-Pro-Glu-Lys-Lys-Val-
Lys-Lys-Ser-Asp-Cys-Gly-Glu-Trp-Gln-Trp-
Ser-Val-Cys-Val-Pro-Thr-Ser-Gly-Asp-Cys-
Gly-Leu-Gly-Thr-Arg-Glu-Gly-Thr-Arg-Thr-
Gly-Ala-Glu-Cys-Lys-Gln-Thr-Met-Lys-Thr-
Gln-Arg-Cys-Lys-Ile-Pro-Cys-Asn-Trp-Lys-
Lys-Gln-Phe-Gly-Ala-Glu-Cys-Lys-Tyr-Gln-
Phe-Gln-Ala-Trp-Gly-Glu-Cys-Asp-Leu-Asn-
Thr-Ala-Leu-Lys-Thr-Arg-Thr-Gly-Ser-Leu-
Lys-Arg-Ala-Leu-His-Asn-Ala-Glu-Cys-Gln-
Lys-Thr-Val-Thr-Ile-Ser-Lys-Pro-Cys-Gly-
Lys-Leu-Thr-Lys-Pro-Lys-Pro-Gln-Ala-Glu-
Ser-Lys-Lys-Lys-Lys-Lys-Glu-Gly-Lys-Lys-
Gln-Glu-Lys-Met-Leu-Asp

(Disulfide bonds between Cys^{15}-Cys^{44}, Cys^{23}-Cys^{53}, Cys^{30}-Cys^{57}, Cys^{67}-Cys^{99}, and Cys^{77}-Cys^{109})

(M.W. 15302.6) $C_{658}H_{1079}N_{197}O_{198}S_{12}$

Heparin-Binding Growth Factor (Neurite Outgrowth-Promoting Factor)

1) Y.-S. Li, P.G. Milner, A.K. Chauhan, M.A. Watson, R.M. Hoffman, C.M. Kodner, J. Milbrandt, and T.F. Deuel, *Science*, **250**, 1690 (1990). (*Primary Structure*)
2) P.G. Milner, D. Shah, R. Veile, H. Donis-Keller, and B.V. Kumar, *Biochemistry*, **31**, 12023 (1992). (*Nucleotide Seq.; Human*)
3) F. Czubayko, A.M. Schulte, G.J. Berchem, and A. Wellstein, *Proc. Natl. Acad. Sci. U.S.A.*, **93**, 14753 (1996). (*Pharmacol.*)
4) T. Inui, M. Nakao, H. Nishio, Y. Nishiuchi, S. Kojima, T. Muramatsu, T. Kimura, and S. Sakakibara, *J. Pept. Res.*, **55**, 384 (2000). (*Chem. Synthesis & S-S Bond*)

PLTX-II

Code	Compound			Price:Yen
4300-s	**PLTX-II**	Vial	0.1 mg	30,000
-20℃	**(Spider, *Plectreurys tristes*)**			

Ala-Asp-Cys-Ser-Ala-Thr-Gly-Asp-Thr-Cys-
Asp-His-Thr-Lys-Lys-Cys-Cys-Asp-Asp-Cys-
Tyr-Thr-Cys-Arg-Cys-Gly-Thr-Pro-Trp-Gly-
Ala-Asn-Cys-Arg-Cys-Asp-Tyr-Tyr-Lys-Ala-
Arg-Cys-Asp-Thr(Palmitoyl)-NH_2

(Disulfide bonds undetermined)

(M.W. 5108.7) $C_{208}H_{313}N_{61}O_{70}S_{10}$

Presynaptic Ca^{2+} Channel Blocker

1) W.D. Branton, L. Kolton, Y.N. Jan, and L.Y. Jan, *J. Neurosci.*, **7**, 4195 (1987). (*Original*)
2) H.-T. Leung, W.D. Branton, H.S. Phillips, L. Jan, and L. Byerly, *Neuron*, **3**, 767 (1989). (*Pharmacol.*)
3) W.D. Branton, M.S. Rudnick, Y. Zhou, E.D. Eccleston, G.B. Fields, and L.D. Bowers, *Nature*, **365**, 496 (1993). (*Thr (Palmitoyl) Amide Structure*)
4) J. Bódi, H. Nishio, Y. Zhou, W.D. Branton, T. Kimura, and S. Sakakibara, *Pept. Res.*, **8**, 228 (1995). (*Chem. Synthesis & Biological Activity*)
5) G.F. King, *Toxicon*, **49**, 513 (2007). (*Review*)

Prepro-hBD-4 (Human, 25-61) See Code 4406 **β-Defensin-4 (Human)** on page 53

Prepro-LEAP-2 (Human, 38-77) See Code 4405 **LEAP-2 (Human)** on page 90

Proadrenomedullin N-terminal 20 Peptide See Code 4291 **PAMP (Human)**, Code 4292 **PAMP (Rat),** and Code 4339 **PAMP-12 (Human)** on page 5

Proangiotensin-12 (Rat) See Code 4439 on page 18

1) B. Sun, K. Fujiwara, S. Adachi, and K. Inoue, *Regul. Pept.*, **126**, 27 (2005). (*Review*)
2) S. Fukusumi, R. Fujii, and S. Hinuma, *Peptides*, **27**, 1073 (2006). (*Review*)
3) D.A. Bechtold and S.M. Luckman, *J. Endocrinol.*, **192**, 3 (2007). (*Review*)

Code	Compound			Price:Yen
4352-v -20℃	**Prolactin-Releasing Peptide (Human)** **PrRP31 (Human)** Ser-Arg-Thr-His-Arg-His-Ser-Met-Glu-Ile-Arg-Thr-Pro-Asp-Ile-Asn-Pro-Ala-Trp-Tyr-Ala-Ser-Arg-Gly-Ile-Arg-Pro-Val-Gly-Arg-Phe-NH_2 (M.W. 3664.1) $C_{160}H_{252}N_{56}O_{42}S$	Vial	0.5 mg	25,000

Multifunctional Peptide in Neuroendocrinology

1) S. Hinuma, Y. Habata, R. Fujii, Y. Kawamata, M. Hosoya, S. Fukusumi, C. Kitada, Y. Masuo, T. Asano, H. Matsumoto, M. Sekiguchi, T. Kurokawa, O. Nishimura, H. Onda, and M. Fujino, *Nature*, **393**, 272 (1998). (*Original; cDNA*)
2) F. Satoh, D.M. Smith, J.V. Gardiner, M. Mahmoodi, K.G. Murphy, M.A. Ghatei, and S.R. Bloom, *Br. J. Pharmacol.*, **129**, 1787 (2000). (*Pharmacol.*)

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Code	Compound			Price:Yen
4353-v -20℃	**Prolactin-Releasing Peptide (Rat)** **PrRP31 (Rat)** Ser-Arg-Ala-His-Gln-His-Ser-Met-Glu-Thr-Arg-Thr-Pro-Asp-Ile-Asn-Pro-Ala-Trp-Tyr-Thr-Gly-Arg-Gly-Ile-Arg-Pro-Val-Gly-Arg-Phe-NH_2 (M.W. 3594.0) $C_{156}H_{242}N_{54}O_{43}S$	Vial	0.5 mg	25,000

Multifunctional Peptide in Neuroendocrinology

1) S. Hinuma, Y. Habata, R. Fujii, Y. Kawamata, M. Hosoya, S. Fukusumi, C. Kitada, Y. Masuo, T. Asano, H. Matsumoto, M. Sekiguchi, T. Kurokawa, O. Nishimura, H. Onda, and M. Fujino, *Nature*, **393**, 272 (1998). (*Original; cDNA*)
2) M. Maruyama, H. Matsumoto, K. Fujiwara, J. Noguchi, C. Kitada, S. Hinuma, H. Onda, O. Nishimura, M. Fujino, T. Higuchi, and K. Inoue, *Neurosci. Lett.*, **276**, 193 (1999). (*Pharmacol.*)
3) F. Satoh, D.M. Smith, J.V. Gardiner, M. Mahmoodi, K.G. Murphy, M.A. Ghatei, and S.R. Bloom, *Br. J. Pharmacol.*, **129**, 1787 (2000). (*Pharmacol.*)
4) H. Matsumoto, M. Maruyama, J. Noguchi, Y. Horikoshi, K. Fujiwara, C. Kitada, S. Hinuma, H. Onda, O. Nishimura, K. Inoue, and M. Fujino, *Neurosci. Lett.*, **285**, 234 (2000). (*Pharmacol.*)

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PTN (Human) See Code 4335 **Pleiotrophin (Human)** on page 128 and 153

ProTx-I

Code	Compound			Price:Yen
4409-s -20℃	**ProTx-I** **(Tarantula, *Thrixopelma pruriens*)** Glu-Cys-Arg-Tyr-Trp-Leu-Gly-Gly-Cys-Ser- Ala-Gly-Gln-Thr-Cys-Cys-Lys-His-Leu-Val- Cys-Ser-Arg-Arg-His-Gly-Trp-Cys-Val-Trp- Asp-Gly-Thr-Phe-Ser (Disulfide bonds between Cys^2-Cys^{16}, Cys^9-Cys^{21}, and Cys^{15}-Cys^{28}) (M.W. 3987.5) $C_{171}H_{245}N_{53}O_{47}S_6$ Purity Information: QE See page IV (XVI)	Vial	0.1 mg	22,000

T-Type Ca^{2+} Channel / Na^+ Channel / K^+ Channel Blocker (Gating Modifier)

ProTx-I was isolated from the venom of the tarantula *Thrixopelma pruriens* and its primary structure was determined to consist of 35 amino acid residues with three intrachain disulfide bonds[1]. This peptide belongs to a member of the "inhibitor cystine knot motif" peptide family. We determined three disulfide linkages in the synthetic peptide as shown above in the sequence (The experimental procedure remains to be published).

Like other venomous toxins, **ProTx-I** exerts inhibitory activities for each ion channels: **i)** T-type Ca^{2+} channel [Cav3.1 (α1G), IC_{50} = 53 nM], **ii)** Na^+ channel [Nav1.2, Nav1.5, Nav1.7 (IC_{50} = 51 nM), and Nav1.8 (IC_{50} = 27 nM)], and **iii)** K^+ channel [Kv2.1 (IC_{50} = 411 nM) and Kv1.3 (40% blocking at 730 nM)]. **ProTx-I** thus elicits multiple channel blocking activities with certain selectivity since K^+ channel inhibitory activity is relatively weak. **ProTx-I** is one of the first high-affinity ligands to be identified that possess tetrodotoxin-resistant Na^+ and T-type Ca^{2+} channel blocking activity. This peptide should prove useful for elucidating the gating mechanism of voltage-dependent ion channels.

1) 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*)
2) T. Ohkubo, J. Yamazaki, and K. Kitamura, *J. Pharmacol. Sci.*, **112**, 452 (2010). (*Pharmacol.*)
3) B.T. Priest, K.M. Blumenthal, J.J. Smith, V.A. Warren, and M.M. Smith, *Toxicon*, **49**, 194 (2007). (*Review*)

ProTx-II

Code	Compound			Price:Yen
4450-s New -20℃	**ProTx-II** **(Tarantula, *Thrixopelma pruriens*)** 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. 3826.6) $C_{168}H_{250}N_{46}O_{41}S_8$	Vial	0.1 mg	20,000

Na^+ Channel (Especially Nav1.7) / Ca^{2+} Channel Blocker (Gating Modifier)

ProTx-II, as well as ProTx-I (Code 4409-s), were isolated from the venom of *Thrixopelma pruriens*[1]. Both peptides contain three disulfide linkages in the inhibitor cystine-knot arrangement, although their primary structures are variable except for the conserved Cys residues; **ProTx-II** is composed of 30 amino acid residues, which is shorter than that of ProTx-I (35 amino acid residues).

Voltage-gated sodium channels play a critical role in modulating the excitability of most neurons, including nociceptive sensory neurons signaling pain. **ProTx-II** was first reported to block Na^+ (including tetrodotoxin-resistant Nav1.8) and Ca^{2+} channels in the similar specificity as ProTx-I; however, in contrast to ProTx-I, **ProTx-II** does not block K^+ channels (Kv1.2 / Kv1.3 / Kv1.5 / Kv2.1) at dose of 460 nM[1]. Later the research using **ProTx-II** was mainly devoted to elucidating the Nav channel subtype-specificity: **i)** with the mutagenesis in both **ProTx-II** and Nav1.5, it is clarified that **ProTx-II** interacting site of Nav1.5 is not the neurotoxin site 4[2], and **ii)** **ProTx-II** is a selective blocker of Nav1.7 (IC_{50} = 0.3 nM) because other Nav1 channels (Nav1.2 - Nav1.6 and Nav1.8) were 100-fold less potent[3]. In the latter special case, phenylalanine 813 in Nav1.7 channel is identified as the interacting site with **ProTx-II**, thus indicating the novel mechanism of **ProTx-II** for the Nav1 channel blocking activity. Binding of ^{125}I-**ProTx-II** is insensitive to the presence of other well characterized Nav1 channel modulators, suggesting that **ProTx-II** binds to a novel site, which may be more conducive to conferring subtype selectivity than the site occupied by traditional local anesthetics and anticonvulsants. Gain-of-function mutations in the Nav1.7 channel lead to dorsal root ganglia neuron hyperexcitability associated with severe pain, whereas loss of the Nav1.7 channel in patients leads to indifference to pain[4].

The specificity of Na^+ channel blocking activity of **ProTx-II** together with ProTx-I are reviewed recently[5]. **ProTx-II** could be an attractive target for pain research due to its reported features of Na^+ channel blocking specificity.

1) 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*)
2) 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*)
3) 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 Nav1.7 Channels*)
4) S.D. Dib-Hajj, T.R. Cummins, J.A. Black, and S.G. Waxman, *Trends Neurosci.*, **30**, 555 (2007). (*Review*)
5) B.T. Priest, K.M. Blumenthal, J.J. Smith, V.A. Warren, and M.M. Smith, *Toxicon*, **49**, 194 (2007). (*Review*)
6) S. Sokolov, R.L. Kraus, T. Scheuer, and W.A. Catterall, *Mol. Pharmacol.*, **73**, 1020 (2008). (*Pharmacol.*)

Psalmotoxin

Code	Compound			Price:Yen
4435-s	**Psalmotoxin 1**	Vial	0.1 mg	23,000

-20℃

PcTX1

(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. 4689.4) $C_{200}H_{312}N_{62}O_{57}S_6$

Purity Information: QE See page IV (XVI)

Selective Blocker for Acid-Sensitive Ion Channel, ASIC1a

The acid-sensing ion channels (ASICs) are members of the epithelial Na^+ channel (EnaC)/degenerin superfamily, which are expressed both in central and peripheral nervous systems. The ASICs are functionally involved in nociception, learning, or mechanosensation. Because ASICs are composed of several subunits in both homo- and hetero-multimeric assembly, specific blockers for each subtype are required for the precise analysis of the functional role of each ASIC.

Psalmotoxin 1, isolated from the venom of the tarantula, *Psalmopoeus cambridgei*, is a 40 amino acid residue peptide with three intramolecular disulfide bonds[1]. Three-dimensional solution structure analysis by NMR revealed that this peptide is a member of inhibitor cystine knot toxins[2]. Among the ASICs, **psalmotoxin 1** blocks the ASIC1a homomultimer selectively (IC_{50} = 0.9 nM)[1], although this peptide binds to ASIC1b in a channel state-dependent manner and promotes its opening[3]. **Psalmotoxin 1** increases the apparent affinity for H^+, by which the ASIC1a channel inhibition may occur[4]. Following activities of **psalmotoxin 1** have been reported: **i)** inhibition of Na^+ currents (both inward and outward) in malignant glioma cells (IC_{50} = 36 pM)[5] and **ii)** protection of the brain from ischemic injury (100 ng/ml)[6].

Psalmotoxin 1 should be useful tool to study the role in the ASIC1a-tiggered responses in the body.

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3) X. Chen, H. Kalbacher, and S. Gründer, *J. Gen. Physiol.*, **127**, 267 (2006). (*Pharmacol.; State-Dependent Function*)
4) X. Chen, H. Kalbacher, and S. Gründer, *J. Gen. Physiol.*, **126**, 71 (2005). (*Pharmacol.; Mechanism of Channel Inhibition*)
5) J.K. Bubien, H.-L. Ji, G. Yancey Gillespie, C.M. Fuller, J.M. Markert, T.B. Mapstone, and D.J. Benos, *Am. J. Physiol. Cell Physiol.*, **287**, C1282 (2004). (*Pharmacol.; Inhibition of Malignant Glioma Na^+ Channels*)
6) Z.-G. Xiong, X.-M. Zhu, X.-P. Chu, M. Minami, J. Hey, W.-L. Wei, J.F. MacDonald, J.A. Wemmie, M.P. Price, M.J. Welsh, and R.P. Simon, *Cell*, **118**, 687 (2004). (*Pharmacol.; Neuroprotection in Ischemia*)
7) S. Diochot, M. Salinas, A. Baron, P. Escoubas, and M. Lazdunski, *Toxicon*, **49**, 271 (2007). (*Review*)
8) Y.J. Qadri, B.K. Berdiev, Y. Song, H.L. Lippton, C.M. Fuller, and D.J. Benos, *J. Biol. Chem.*, **284**, 17625 (2009). (*Pharmacol.*)

Purotoxin

Code	Compound			Price:Yen
4457-s New -20℃	**Purotoxin-1** **(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. 3836.5) $C_{155}H_{248}N_{50}O_{48}S_8$ *Inhibitor of P2X3 Purinoreceptors*	Vial	0.1 mg	22,000

Lots of mechanisms for pain signaling are proposed. Recently, the specific Na^+ channels targeted by peptidic toxins, such as μ-conotoxin SIIIA (Code 4440-v) and ProTx-II (Code 4450-s), are receiving much attention. P2X3 purinoreceptors are another component participating in pain signaling, which are activated by ATP and other nucleotides. Very recently, P2X3 inhibitory peptide named **purotoxin-1** has been isolated from the wolf spider *Geolycosa* sp.: a 35-residue peptide with 4 disulfide bonds, three of which are connected in the inhibitor cystine knot arrangement[1]. Inhibitory potency of desensitized P2X3 receptors is reported to be as high as 12 nM and specificity to P2X3 receptors is high because this peptide does not block other voltage- and ligand-gated channels including vanilloid TRPV1 receptors. A low dose of 0.5 nM of this peptide reduced capsaicin-induced nociception in rat.

Purotoxin-1 may contribute to the development of novel antinociceptive drugs.

1) 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.*)

Pyroglutamylated RFamide Peptide

Code	Compound			Price:Yen
4419-s -20℃	**Pyroglutamylated RFamide Peptide (Human)** **QRFP (Human)** Pyr-Asp-Glu-Gly-Ser-Glu-Ala-Thr-Gly-Phe-Leu-Pro-Ala-Ala-Gly-Glu-Lys-Thr-Ser-Gly-Pro-Leu-Gly-Asn-Leu-Ala-Glu-Glu-Leu-Asn-Gly-Tyr-Ser-Arg-Lys-Lys-Gly-Gly-Phe-Ser-Phe-Arg-Phe-NH_2 (M.W. 4503.8) $C_{199}H_{301}N_{55}O_{65}$	Vial	0.1 mg	13,000

Endogenous Ligand for AQ27 / SP9155 / GPR103

The group of Takeda Pharmaceutical Company Limited has long been involved in discovering orphan receptor ligands and identified a novel peptide in human utilizing the recently established gene database. Actually, they searched the database to detect peptides with the carboxyl-terminal Arg-Phe-NH_2 (RFamide) moiety in the mature peptide. As a result, the peptide termed **pyroglutamylated RFamide peptide** (**QRFP**) was identified by analyzing the expressed peptide in Chinese hamster ovary cells as a 43 amino acid residue peptide[1]. The peptide corresponding to the carboxyl-terminal 26 amino acid residues of **QRFP** was also predicted by another group using a similar approach and then termed P518[2]. Both of these peptides were found to interact with an orphan receptor (AQ27/SP9155/GPR103; all of these denote the same orphan receptor of interest). Human 26RFa was proposed by another group based on the primary structure of their determined frog peptide in which 26RFa is identical to P518[3].

The biological activities of **QRFP** and 26RFa reported are: **i)** upon intravenous administration in rats at doses between 40 and 400 nmol/kg, **QRFP** induced aldosterone secretion in a dose-dependent manner, **ii)** intracerebroventricular administration of 26RFa in mice (after partial food deprivation for 18 h) stimulated food intake at doses of 100 and 1000 ng/mouse, **iii)** central **QRFP** (rat QRFP is used in this report) administration evoked feeding, behavioral arousal, and elevation of blood pressure in mice[4], and **iv)** intracerebroventricular infusion of **QRFP** increased fat mass and decreased rectal temperature in mice[5].

QRFP might have variable activities other than those identified, thus, it should serve as an essential member of the RFamide family peptides in humans.

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2) Y. Jiang, L. Luo, E.L. Gustafson, D. Yadav, M. Laverty, N. Murgolo, G. Vassileva, M. Zeng, T.M. Laz, J. Behan, P. Qiu, L. Wang, S. Wang, M. Bayne, J. Greene, F. Monsma, Jr., and F.L. Zhang, *J. Biol. Chem.*, **278**, 27652 (2003). (*Orphan Receptor Ligand / 26-Residue Peptide, P518*)
3) N. Chartrel, C. Dujardin, Y. Anouar, J. Leprince, A. Decker, S. Clerens, J.-C. Do-Régo, F. Vandesande, C. Llorens-Cortes, J. Costentin, J.-C. Beauvillain, and H. Vaudry, *Proc. Natl. Acad. Sci. U.S.A.*, **100**, 15247 (2003). (*26-Residue Peptide, 26RFa*)
4) S. Takayasu, T. Sakurai, S. Iwasaki, H. Teranishi, A. Yamanaka, S.C. Williams, H. Iguchi, Y.I. Kawasawa, Y. Ikeda, I. Sakakibara, K. Ohno, R.X. Ioka, S. Murakami, N. Dohmae, J. Xie, T. Suda, T. Motoike, T. Ohuchi, M. Yanagisawa, and J. Sakai, *Proc. Natl. Acad, Sci. U.S.A.*, **103**, 7438 (2006). (*Pharmacol.*)
5) R. Moriya, H. Sano, T. Umeda, M. Ito, Y. Takahashi, M. Matsuda, A. Ishihara, A. Kanatani, and H. Iwaasa, *Endocrinology*, **147**, 2916 (2006). (*Pharmacol.*)
6) S. Fukusumi, R. Fujii, and S. Hinuma, *Peptides*, **27**, 1073 (2006). (*Review*)
7) D.A. Bechtold and S.M. Luckman, *J. Endocrinol.*, **192**, 3 (2007). (*Review*)

Pyr-Lys-Arg-Pro-Ser-Gln-Arg-Ser-Lys-Tyr-Leu See Code 4237 on page 223

QRFP (Human) See Code 4419 **Pyroglutamylated RFamide Peptide (Human)** above

Renin Substrate See Code 3229 **Nma-Ile-His-Pro-Phe-His-Leu-Val-Ile-His-Thr-Lys(Dnp)-D-Arg-D-Arg-NH_2** on page 222, Code 3110 **Suc-Arg-Pro-Phe-His-Leu-Leu-Val-Tyr-MCA** on page 226 and Code 4133 **Asp-Arg-Val-Tyr-Ile-His-Pro-Phe-His-Leu-Val-Ile-His** on page 209

Code	Compound			Price:Yen
4380-s -20℃	**RFamide-Related Peptide-1 (Human)** **RFRP-1 (Human)** Ser-Leu-Asn-Phe-Glu-Glu-Leu-Lys-Asp-Trp-Gly-Pro-Lys-Asn-Val-Ile-Lys-Met-Ser-Thr-Pro-Ala-Val-Asn-Lys-Met-Pro-His-Ser-Phe-Ala-Asn-Leu-Pro-Leu-Arg-Phe-NH_2 (M.W. 4256.9) $C_{195}H_{304}N_{52}O_{51}S_2$ *Endogenous Ligand for OT7T022 / FF1*	Vial	0.1 mg	12,000

Among peptides with the carboxyl (C)-terminal Arg-Phe-NH_2 (RFamide family of peptides), FMRF-Amide (Code 4142-v) was first isolated from Mollusks in 1977[1]. Another member of this family, Leu-Pro-Leu-Arg-Phe-NH_2 (Code 4144), was identified in chicken brain in 1983, yet there had not been any reports of corresponding mammalian peptides with the same five C-terminal residues. A related peptide was deduced from a human genome database search by elucidating its endogenous form through application of peptide / DNA chemistry. The name of the target peptide is **RFamide-related peptide-1** (**RFRP-1**).

Human **RFRP-1** was first predicted to be a 12 amino acid residue peptide. Subsequent synthesis and biochemical studies found it to be a ligand for the orphan receptor, OT7T022 (also called FF1)[2]. Later, the endogenous form of human **RFRP-1** was determined to be composed of 37 amino acid residues including the above 12 residue peptide at its C-terminus[3]. The same peptide was isolated by another group who named it NPSF(1-37)[4]. Human **RFRP-1** inhibits forskolin-stimulated cAMP production in CHO cells expressing OT7T022 (ED_{50}=21 nM). The potency is slightly less than that of the 12 residue peptide (ED_{50}=4.9 nM), however, this result suggests that the C-terminal portion of **RFRP-1** is responsible for the recognition of OT7T022. Immunoreactive **RFRP-1** was observed in the central nervous system (CNS), with the highest amount detected in the hypothalamus[5]. Specific receptors of **RFRP-1**, OT7T022 or FF1, were found in the CNS. It is interesting to note that the synthetic peptide composed of 12 amino acid residues described above showed prolactin-releasing activity at 10 nM[2] and that rat NPSF(1-37) had the anti-opioid effect in two models of nociception at 1.0 nmol/rat[4]. Thus, **RFRP-1** should serve as an important biochemical tool to further research investigations. Later, it was reported that intrathecal administration of **RFRP-1** induced tactile antiallodynia and thermal antinociception in rat[6].

1) D.A. Price and M.J. Greenberg, *Science*, **197**, 670 (1977). (*Original*; *FMRF-Amide*)
2) 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 & Pharmacol.*)
3) S. Fukusumi, Y. Habata, H. Yoshida, N. Iijima, Y. Kawamata, M. Hosoya, R. Fujii, S. Hinuma, C. Kitada, Y. Shintani, M. Suenaga, H. Onda, O. Nishimura, M. Tanaka, Y. Ibata, and M. Fujino, *Biochim. Biophys. Acta*, **1540**, 221 (2001). (*Endogenous Form*)
4) Q. Liu, X.-M. Guan, W.J. Martin, T.P. McDonald, M.K. Clements, Q. Jiang, Z. Zeng, M. Jacobson, D.L. Williams, Jr., H. Yu, D. Bomford, D. Figueroa, J. Mallee, R. Wang, J. Evans, R. Gould, and C.P. Austin, *J. Biol. Chem.*, **276**, 36961 (2001). (*Original*; *NPSF*)
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6) A. Pertovaara, M. Östergård, M.-L. Änkö, S. Lehti-Koivunen, A. Brandt,b W. Hong, E.R. Korpi, and P. Panula, *Neuroscience*, **134**, 1023 (2005). (*Pharmacol.*)
7) S. Fukusumi, R. Fujii, and S. Hinuma, *Peptides*, **27**, 1073 (2006). (*Review*)
8) D.A. Bechtold and S.M. Luckman, *J. Endocrinol.*, **192**, 3 (2007). (*Review*)

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RFamide-Related Peptides (continued)

Code	Compound			Price:Yen
4461-v New -20℃	**RFamide-Related Peptide-3 (Human)** **RFRP-3 (Human)** **(Ovine)** 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*	Vial	0.5 mg	6,000
4462-v New -20℃	**RFamide-Related Peptide-3 (Rat)** **RFRP-3 (Rat)** Ala-Asn-Met-Glu-Ala-Gly-Thr-Met-Ser-His-Phe-Pro-Ser-Leu-Pro-Gln-Arg-Phe-NH_2 (M.W. 2020.3) $C_{88}H_{134}N_{26}O_{25}S_2$ *Gonadotropin-Inhibitory Hormone*	Vial	0.5 mg	8,000

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: **i)** function as gonadotropin inhibitory hormone (GnIH), resulting in the reduction in LH secretion; **ii)** increase in food intake and growth hormone secretion; and **iii)** 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, 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 & Rat cDNA*)
2) 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*)
3) 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). (*Endogenous Form: Human RFRP-3*)
4) K. Ukena, E. Iwakoshi, H. Minakata, and K. Tsutsui, *FEBS Lett.*, **512**, 255 (2002). (*Endogenous Form: Rat RFRP-3*)
5) I.J. Clarke, Y. Qi, I.P. Sari, and J.T. Smith., *Front.Neuroendocrinol.*, **30**, 371 (2009). (*Review: Pharmacol.*)
6) M.A. Johnson and G.S. Fraley, *Neuroendocrinology*, **88**, 305 (2008). (*Pharmacol.*)

Salusins

Code	Compound			Price:Yen
4417-s -20℃	**Salusin-α (Human)** Ser-Gly-Ala-Leu-Pro-Pro-Ala-Pro-Ala-Ala-Pro-Arg-Pro-Ala-Leu-Arg-Ala-Gln-Arg-Ala-Gly-Pro-Ala-Gly-Pro-Gly-Ala-Lys-NH_2 (M.W. 2603.0) $C_{114}H_{192}N_{40}O_{30}$ *Hypotensive / Mitogenic Peptide*	Vial	0.1 mg	12,000
4418-s -20℃	**Salusin-β (Human)** Ala-Ile-Phe-Ile-Phe-Ile-Arg-Trp-Leu-Leu-Lys-Leu-Gly-His-His-Gly-Arg-Ala-Pro-Pro (M.W. 2342.8) $C_{115}H_{176}N_{32}O_{21}$ *Hypotensive / Mitogenic Peptide*	Vial	0.1 mg	9,000

Biologically active peptides have long been isolated from natural sources using the chromatographic separation and purification methods to identify new endogenous ligands. Advancements in genomic research led to strategies of discovering novel peptides, notably using bioinformatical DNA sequence analysis techniques. Late in 2003, two peptides termed **salusin-α** and **salusin-β** were discovered using this technique; that is, the selection of putative secretory prepropeptides, which possess the structural features of processing signals resulting in mature peptides with less than 40 amino acid residues[1]. **Salusin-α** was predicted to be a 28-residue peptide with an amidated carboxyl-terminus, while **salusin-β** was predicted to be a 20-residue peptide with a free carboxyl-terminus. These two peptides were encoded in the order of **salusin-β** and **salusin-α** from a single mRNA transcribed from *TOR2A*.

Preprosalusin: AWD • • • • • • • • • • • • • RK-[**salusin-β**]-RR-[**salusin-α**]G*
* carboxyl-terminal Gly in the above sequence is the precursor of the amide structure.
salusin-α: SGALPPAPAAPRPALRAQRAGPAGPGAK-NH_2
salusin-β: AIFIFIRWLLKLGHHGRAPP

Chemically synthesized **salusin-α** and **salusin-β** exerted the following biological activities[1]: **i)** mitogenic effects in rat vascular smooth muscle cells and fibroblasts, probably through mutually distinct receptors, **ii)** dose-dependent hypotensive activity in rats (1-10 nmol/kg for **salusin-α** and 0.1-1 nmol/kg for **salusin-β**), and **iii)** [Arg^8]-vasopressin releasing activity in perfused rat pituitaries (exclusive activity of **salusin-β** in a dose-dependent manner [0.01-100 nM]). Immunohistochemical experiments showed that both of these peptides are present in numerous tissues, including kidney as the major source. Following interesting observations were reported further: **i)** **salusin-β** induced hypotension and bradycardia were completely blocked by pretreatment with atropine, but not by propranolol[2], **ii)** **salusin-α** and **salusin-β** did not directly affect cardiac function in the rat heart, but promote cardiomyocyte growth[3], and **iii)** **salusin-β** activated the mouse mas-like G protein-coupled receptor, mMrgA1, with an EC_{50} of about 300 nM[4].

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2) H. Izumiyama, H. Tanaka, K. Egi, M. Sunamori, Y. Hirata, and M. Shichiri, *Hypertension*, **45**, 419 (2005). (*Pharmacol.*)
3) F. Yu, J. Zhao, J. Yang, B. Gen, S. Wang, X. Feng, C. Tang, and L. Chang, *Regul. Pept.*, **122**, 191 (2004). (*Pharmacol.*)
4) Z. Wang, T. Takahashi, Y. Saito, H. Nagasaki, N. K. Ly, H.-P. Nothacker, R.K. Reinscheid, J. Yang, J. K. Chang, M. Shichiri, and O. Civelli, *Eur. J. Pharmacol.* **539**, 145 (2006). (*Pharmacol.*)
5) K. Sato, T. Koyama, T. Tateno, Y. Hirata, and M. Shichiri, *Peptides*, **27**, 2561 (2006). (*Radioimmunoassay*)
6) T. Watanabe, K. Nishio, T. Kanome, T. Matsuyama, S. Koba, T. Sakai, K. Sato, S. Hongo, K. Nose, H. Ota, Y. Kobayashi, T. Katagiri, M. Shichiri, and A. Miyazaki, *Circulation*, **117**, 638 (2008). (*Pharmacol.*)
7) J.S. Shi, D. Li, N. Li, L. Lin, Y.J. Yang, Y. Tang, T. Sun, W.J. Yuan, and A.J. Ren, *Peptides*, **31**, (2010) (*Pharmacol.*)

Sarafotoxins

1) E. Kochva, A. Bdolah, and Z. Wollberg, *Toxicon*, **31**, 541 (1993). (*Review*)
2) F. Ducancel, *Toxicon*, **40**, 1541 (2002). (*Review*)
3) F. Ducancel, *Cell. Mol. Life Sci.*, **62**, 2828 (2005). (*Review*)

Code	Compound			Price:Yen
4206-s -20℃	**Sarafotoxin S6b***	Vial	0.1 mg	15,000

(Snake, *Atractaspis engaddensis*)
Cys-Ser-Cys-Lys-Asp-Met-Thr-Asp-Lys-Glu-Cys-Leu-Tyr-Phe-Cys-His-Gln-Asp-Val-Ile-Trp
(Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11})
(M.W. 2563.9) $C_{110}H_{159}N_{27}O_{34}S_5$ [120972-53-4]

Endothelin Related Peptide

1) C. Takasaki, N. Tamiya, A. Bdolah, Z. Wollberg, and E. Kochva, *Toxicon*, **26**, 543 (1988). (*Original; Chem. Structure*)
2) Y. Kloog, I. Ambar, M. Sokolovsky, E. Kochva, Z. Wollberg, and A. Bdolah, *Science*, **242**, 268 (1988). (*Original; Biochem.*)
3) K. Nakajima, S. Kumagaye, H. Nishio, H. Kuroda, T.X. Watanabe, Y. Kobayashi, H. Tamaoki, T. Kimura, and S. Sakakibara, *J. Cardiovasc. Pharmacol.*, **13 (Suppl. 5)**, S8 (1989). (*Chem. Synthesis & Biological Activity*)
4) T.X. Watanabe, Y. Itahara, K. Nakajima, S. Kumagaye, T. Kimura, and S. Sakakibara, *J. Cardiovasc. Pharmacol.*, **17 (Suppl. 7)**, S5 (1991). (*Pharmacol.*)

4246-s -20℃	**Sarafotoxin S6c***	Vial	0.1 mg	15,000

(Snake, *Atractaspis engaddensis*)
Cys-Thr-Cys-Asn-Asp-Met-Thr-Asp-Glu-Glu-Cys-Leu-Asn-Phe-Cys-His-Gln-Asp-Val-Ile-Trp
(Disulfide bonds between Cys^{1}-Cys^{15} and Cys^{3}-Cys^{11})
(M.W. 2515.8) $C_{103}H_{147}N_{27}O_{37}S_5$ [121695-87-2]

Selective ET_B Receptor Agonist

1) C. Takasaki, N. Tamiya, A. Bdolah, Z. Wollberg, and E. Kochva, *Toxicon*, **26**, 543 (1988). (*Original; Chem. Structure*)
2) W.G. Nayler, X.H. Gu, and D.J. Casley, *Biochem. Biophys. Res. Commun.*, **161**, 89 (1989). (*Pharmacol.*)
3) D.L. Williams, Jr., K.L. Jones, D.J. Pettibone, E.V. Lis, and B.V. Clineschmidt, *Biochem. Biophys. Res. Commun.*, **175**, 556 (1991). (*Pharmacol.*)

Schizophrenia Related Peptide

4061 -20℃	**Schizophrenia Related Peptide**	Bulk	25 mg 100 mg	8,300 17,000

Thr-Val-Leu
(M.W. 331.41) $C_{15}H_{29}N_3O_5$

1) C.E. Frohman, *Chem. Eng. News*, **1977**, 35. (*Original*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Scyllatoxin

Code	Compound			Price:Yen
4260-s -20℃	**Scyllatoxin** **Leiurotoxin I** **(Scorpion, *Leiurus quinquestriatus hebraeus*)** Ala-Phe-Cys-Asn-Leu-Arg-Met-Cys-Gln-Leu-Ser-Cys-Arg-Ser-Leu-Gly-Leu-Leu-Gly-Lys-Cys-Ile-Gly-Asp-Lys-Cys-Glu-Cys-Val-Lys-His-NH_2 (Reported disulfide bonds between Cys^3-Cys^{21}, Cys^8-Cys^{26}, and Cys^{12}-Cys^{28}) (M.W. 3423.1) $C_{142}H_{237}N_{45}O_{39}S_7$ [142948-19-4] *Small Conductance Ca^{2+}-Activated K^+ Channel Blocker*	Vial	0.1 mg	20,000

1) G.G. Chicchi, G. Gimenez-Gallego, E. Ber, M.L. Garcia, R. Winquist, and M.A. Cascieri, *J. Biol. Chem.*, **263**, 10192 (1988). (*Original*)
2) P. Auguste, M. Hugues, C. Mourre, D. Moinier, A. Tartar, and M. Lazdunski, *Biochemistry*, **31**, 648 (1992). (*Pharmacol.*)
3) J.C. Martins, F.J.M. Van de Ven, and F.A.M. Borremans, *J. Mol. Biol.*, **253**, 590 (1995). (*S-S Bond*)

Secretins

1) J.E. Jorpes and V. Mutt (eds.), Secretin, Cholecystokinin, Pancreozymin and Gastrin, *Handbook of Experimental Pharmacology*, **Vol.34**, Springer-Verlag, Berlin, 1973. (*Review*)

4165-v -20℃	**Secretin (Human)** His-Ser-Asp-Gly-Thr-Phe-Thr-Ser-Glu-Leu-Ser-Arg-Leu-Arg-Glu-Gly-Ala-Arg-Leu-Gln-Arg-Leu-Leu-Gln-Gly-Leu-Val-NH_2 (M.W. 3039.4) $C_{130}H_{220}N_{44}O_{40}$ [108153-74-8]	Vial	0.5 mg	29,000

1) M. Carlquist, H. Jörnvall, W.G. Forssmann, L. Thulin, C. Johansson, and V. Mutt, *IRCS Med. Sci.*, **13**, 217 (1985). (*Original*)
2) K. Iguchi, T. Mochizuki, T. Inoue, C. Yanaihara, S. Naruse, K. Nokihara, W.G. Forssmann, V. Mutt, T. Kanno, and N. Yanaihara, *Peptide Chemistry 1985*, 191 (1986). (*Chem. Synthesis & Biological Activity*)

4112-v -20℃	**Secretin (Porcine)** His-Ser-Asp-Gly-Thr-Phe-Thr-Ser-Glu-Leu-Ser-Arg-Leu-Arg-Asp-Ser-Ala-Arg-Leu-Gln-Arg-Leu-Leu-Gln-Gly-Leu-Val-NH_2 (M.W. 3055.4) $C_{130}H_{220}N_{44}O_{41}$ [17034-35-4]	Vial	0.5 mg	29,000

Ser-Gln-Asn-Tyr-Pro-Ile-Val See Code 4236 on page 224

Serum Thymic Factor

4058-v -20℃	**Serum Thymic Factor** Pyr-Ala-Lys-Ser-Gln-Gly-Gly-Ser-Asn (M.W. 858.85) $C_{33}H_{54}N_{12}O_{15}$ [63958-90-7]	Vial	0.5 mg	3,600
4058 -20℃	**Serum Thymic Factor** Pyr-Ala-Lys-Ser-Gln-Gly-Gly-Ser-Asn • AcOH • $2H_2O$ (M.W. 858.85• 60.05 • 36.03) $C_{33}H_{54}N_{12}O_{15}$ • CH_3COOH • $2H_2O$	Bulk	25 mg	51,000

1) J.F. Bach, M. Dardenne, J.M. Pleau, and J. Rosa, *Nature*, **266**, 55 (1977). (*Original*)

SNX-482

Code	Compound			Price:Yen
4363-s -20℃	**SNX-482** **(Tarantula, *Hysterocrates gigas*)** Gly-Val-Asp-Lys-Ala-Gly-Cys-Arg-Tyr-Met- Phe-Gly-Gly-Cys-Ser-Val-Asn-Asp-Asp-Cys- Cys-Pro-Arg-Leu-Gly-Cys-His-Ser-Leu-Phe- Ser-Tyr-Cys-Ala-Trp-Asp-Leu-Thr-Phe-Ser- Asp (Reported disulfide bonds between Cys^{7}-Cys^{21}, Cys^{14}-Cys^{26}, and Cys^{20}-Cys^{33}) (M.W. 4495.0) $C_{192}H_{274}N_{52}O_{60}S_7$ [203460-30-4]	Vial	0.1 mg	30,000

Class E (R-type) Ca^{2+} Channel Blocker

1) R. Newcomb, B. Szoke, A. Palma, G. Wang, X.-h. Chen, W. Hopkins, R. Cong, J. Miller, L. Urge, K. Tarczy-Hornoch, J.A. Loo, D.J. Dooley, L. Nadasdi, R. W. Tsien, J. Lemos, and G. Miljanich, *Biochemistry*, **37**, 15353 (1998). (*Original*)
2) L. Ürge, B. Szöke, D. Silva, P. Tran-Tau, D. Hom, K. Tarczy-Hornoch, and L. Nádasdi, *In*, Peptides 1998, Proceedings of 25th European Peptide Symposium (S. Bajusz and F. Hudecz, eds.), Akadémiai Kiadó Butapest, 1999, pp.748-749. (*S-S Bond*)
3) A. Tottene, S. Volsen, and D. Pietrobon, *J. Neurosci.*, **20**, 171 (2000). (*Pharmacol.*)
4) G. Wang, G. Dayanithi, R. Newcomb, and J. R. Lemos, *J. Neurosci.*, **19**, 9235 (1999). (*Pharmacol.*)
5) D. Sochivko, A. Pereverzev, N. Smyth, C. Gissel, T. Schneider, and H. Beck, *J. Physiol.*, **542**, 699 (2002). (*Pharmacol.*)
6) X. Jing, D.-Q. Li, C.S. Olofsson, A. Salehi, V.V. Surve, J. Caballero, R. Ivarsson, I. Lundquist, A. Pereverzev, T. Schneider, P. Rorsman, and E. Renstroem, *J. Clin. Invest.*, **115**, 146 (2005). (*Pharmacol.*)

Sodium Potassium ATPase Inhibitor-1 (SPAI-1)

Code	Compound			Price:Yen
4216-s -20℃	**SPAI-1 (Porcine)** **Sodium Potassium ATPase Inhibitor-1 (Porcine)** **Na^+, K^+-ATPase Inhibitor-1 (Porcine)** Leu-Leu-Ser-Lys-Arg-Gly-His-Cys-Pro-Arg- Ile-Leu-Phe-Arg-Cys-Pro-Leu-Ser-Asn-Pro- Ser-Asn-Lys-Cys-Trp-Arg-Asp-Tyr-Asp-Cys- Pro-Gly-Val-Lys-Lys-Cys-Cys-Glu-Gly-Phe- Cys-Gly-Lys-Asp-Cys-Leu-Tyr-Pro-Lys (Disulfide bonds between Cys^{8}-Cys^{37}, Cys^{15}-Cys^{41}, Cys^{24}-Cys^{36}, and Cys^{30}-Cys^{45}) (M.W. 5628.6) $C_{245}H_{378}N_{72}O_{65}S_8$	Vial	0.1 mg	23,000

1) K. Araki, J. Kuroki, O. Ito, M. Kuwada, and S. Tachibana, *Biochem. Biophys. Res. Commun.*, **164**, 496 (1989). (*Original*)
2) K. Araki, M. Kuwada, O. Ito, J. Kuroki, and S. Tachibana, *Biochem. Biophys. Res. Commun.*, **172**, 42 (1990). (*S-S Bond*)
3) H. Nishio, S. Kumagaye, H. Kuroda, N. Chino, J. Emura, T. Kimura, and S. Sakakibara, *Pept. Res.*, **5**, 227 (1992). (*Chem. Synthesis*)

Somatostatin (SRIF) and Related Peptides

Code	Compound			Price:Yen
4023-v -20℃	**Somatostatin** **SRIF** (Somatotropin Release Inhibiting Factor) **GIF** (Growth Hormone Release Inhibiting Factor) **(Human, Ovine, Porcine, Rat, Mouse)** Ala-Gly-Cys-Lys-Asn-Phe-Phe-Trp-Lys-Thr- Phe-Thr-Ser-Cys (Disulfide bond between Cys^3-Cys^{14}) (M.W. 1637.9) $C_{76}H_{104}N_{18}O_{19}S_2$ [38916-34-6]	Vial	0.5 mg	9,000
4023 -20℃	**Somatostatin** **SRIF** (Somatotropin Release Inhibiting Factor) **GIF** (Growth Hormone Release Inhibiting Factor) **(Human, Ovine, Porcine, Rat, Mouse)** Ala-Gly-Cys-Lys-Asn-Phe-Phe-Trp-Lys-Thr- Phe-Thr-Ser-Cys • 2AcOH • $6H_2O$ (Disulfide bond between Cys^3-Cys^{14}) (M.W. 1637.9 • 120.10 • 108.09) $C_{76}H_{104}N_{18}O_{19}S_2$ • $2CH_3COOH$ • $6H_2O$ 1) P. Brazeau, W. Vale, R. Burgus, N. Ling, M. Butcher, J. Rivier, and R. Guillemin, *Science*, **179**, 77 (1973). (*Original; Ovine*) 2) D.J. Koerker, W. Ruch, E. Chideckel, J. Palmer, C.J. Goodner, J. Ensinck, and C.C. Gale, *Science*, **184**, 482 (1974). (*Pharmacol.*) 3) A. Arimura, H. Sato, A. Dupont, N. Nishi, and A.V. Schally, *Science*, **189**, 1007 (1975). (*Pharmacol.*) 4) L.-P. Shen, R.L. Pictet, and W.J. Rutter, *Proc. Natl. Acad. Sci. U.S.A.*, **79**, 4575 (1982). (*cDNA Seq.; Human*)	Bulk	25 mg	91,000
4101-v -20℃	**[D-Trp^8]-Somatostatin** Ala-Gly-Cys-Lys-Asn-Phe-Phe-D-Trp-Lys-Thr- Phe-Thr-Ser-Cys (Disulfide bond between Cys^3-Cys^{14}) (M.W. 1637.9) $C_{76}H_{104}N_{18}O_{19}S_2$ [58976-46-8] 1) J. Rivier, H. Brown, and W. Vale, *Biochem. Biophys. Res. Commun.*, **65**, 746 (1975). (*Original*)	Vial	0.5 mg	12,000
4038-v -20℃	**[Tyr^1]-Somatostatin** Tyr-Gly-Cys-Lys-Asn-Phe-Phe-Trp-Lys-Thr- Phe-Thr-Ser-Cys (Disulfide bond between Cys^3-Cys^{14}) (M.W. 1730.0) $C_{82}H_{108}N_{18}O_{20}S_2$ [59481-23-1] Purity Information : QX See page IV (XVI) *For Radioimmunoassay* 1) A. Arimura, H. Sato, D.H. Coy, and A.V. Schally, *Proc. Soc. Exp. Biol. Med.*, **148**, 784 (1975). (*Original*)	Vial	0.5 mg	11,000

Spantide See Code 4173 **[D-Arg^1,D-Trp^{7,9},Leu^{11}]-Substance P** on page 145

Stichodactyla Toxin

Code	Compound			Price:Yen
4287-s -20℃	**Stichodactyla Toxin** **ShK** **(Sea Anemone, *Stichodactyla helianthus*)** Arg-Ser-Cys-Ile-Asp-Thr-Ile-Pro-Lys-Ser- Arg-Cys-Thr-Ala-Phe-Gln-Cys-Lys-His-Ser- Met-Lys-Tyr-Arg-Leu-Ser-Phe-Cys-Arg-Lys- Thr-Cys-Gly-Thr-Cys (Reported disulfide bonds between Cys^{3}-Cys^{35}, Cys^{12}-Cys^{28}, and Cys^{17}-Cys^{32}) (M.W. 4054.8) $C_{169}H_{274}N_{54}O_{48}S_7$	Vial	0.1 mg	22,000

Voltage-Dependent K^+ Channel (A Channel) Blocker

1) E. Karlsson, A.L. Harvey, A. Aneiros, and O. Castaneda, *Toxicon*, **31**, 504 (1993). (*Original; in Abstract*)
2) J.Pohl, F. Hubalek, M.E. Byrnes, K.R. Nielsen, A. Woods, and M.W. Pennington, *Lett. Pept. Sci.*, **1**, 291 (1994). (*S-S Bond*)
3) O. Castañeda, V.Sotolongo, A.M. Amor, R. Stöcklin, A.J. Anderson, A.L. Harvey, Å. Engström, C. Wernstedt, and E. Karlsson, *Toxicon*, **33**, 603 (1995). (*Pharmacol.*)

Substance K See Code 4154 **Neurokinin A** on page 101

Stresscopin / Urocortin and Related Peptides

1) C.L. Chang and S.Y.T. Hsu, *Peptides*, **25**, 1681 (2004). (*Review*)
2) E.A. Woodcock, *Endocrinology*, **145**, 21 (2004). (*Review*)
3) Y. Kuperman and A. Chen, *Trends Endocrinol. Metab.*, **19**, 122 (2008). (*Review*)
4) W.H. Pan and A.J. Kastin, *Prog. Neurobiol.*, **84**, 148 (2008). (*Review*)
5) P. Boonprasert, N. Lailerd, and N. Chattipakorn, *Int. J. Cardiol.*, **127**, 307 (2008). (*Review*)

List of Stresscopin / Urocortin and Related Peptides

	Code	Compound	Quantity	Price: Yen	Page
	4387-s	**Stresscopin (Human)**	0.1 mg vial	16,000	below
	4388-s	**Stresscopin-Related Peptide (Human)**	0.1 mg vial	18,000	143
	4328-s	**Urocortin (Human)**	0.1 mg vial	14,000	143
	4327-s	**Urocortin (Rat)**	0.1 mg vial	14,000	143
	4383-s	**Urocortin II (Mouse)**	0.1 mg vial	14,000	144

Sequence Comparison of Human "Stresscopin / Urocortin III" and "Stresscopin-Related Peptide / Urocortin II"

Code	Compound	Sequence
4387-s	**Stresscopin (Human)**	**TK** FTLSLDVPTN IMNLLFNIAK AKNLRAQAAA NAHLMAQI-NH_2
—	**Urocortin III (Human)**	FTLSLDVPTN IMNLLFNIAK AKNLRAQAAA NAHLMAQI-NH_2
4388-s	**Stresscopin-Related Peptide (Human)**	**HPGSR** IVLSLDVPIG LLQILLEQAR ARAAREQATT NARILARV-NH_2
—	**Urocortin II (Human)**	IVLSLDVPIG LLQILLEQAR ARAAREQAAT NARILARV-NH_2

4387-s -20℃	**Stresscopin (Human)** Thr-Lys-Phe-Thr-Leu-Ser-Leu-Asp-Val-Pro- Thr-Asn-Ile-Met-Asn-Leu-Leu-Phe-Asn-Ile- Ala-Lys-Ala-Lys-Asn-Leu-Arg-Ala-Gln-Ala- Ala-Ala-Asn-Ala-His-Leu-Met-Ala-Gln-Ile-NH_2 (M.W. 4367.1) $C_{195}H_{326}N_{56}O_{53}S_2$	Vial	0.1 mg	16,000

Selective Ligand for Type 2 CRF Receptors

1) S.Y. Hsu and A.J.W. Hsueh, *Nat. Med.*, **7**, 605 (2001). (*Original*)
2) F.M. Dautzenberg and R.L. Hauger, *Trends Pharmacol. Sci.*, **23**, 71 (2002). (*Review*)
3) V. Martínez, L. Wang, J.E. Rivier, W. Vale, and Y Taché, *J. Pharmacol. Exp. Ther.*, **301**, 611 (2002). (*Pharmacol.*)
4) A. Chanalaris, K.M. Lawrence, A. Stephanou, R.D. Knight, S.Y. Hsu, A.J.W. Hsueh, and D.S. Latchman, *J. Mol. Cell. Cardiol.*, **35**, 1295 (2003). (*Pharmacol.*)

Code	Compound			Price:Yen
4388-s -20℃	**Stresscopin-Related Peptide (Human)** (Hydrochloride Form) His-Pro-Gly-Ser-Arg-Ile-Val-Leu-Ser-Leu-Asp-Val-Pro-Ile-Gly-Leu-Leu-Gln-Ile-Leu-Leu-Glu-Gln-Ala-Arg-Ala-Arg-Ala-Ala-Arg-Glu-Gln-Ala-Thr-Thr-Asn-Ala-Arg-Ile-Leu-Ala-Arg-Val-NH_2 (M.W. 4687.5) $C_{205}H_{358}N_{68}O_{57}$ *Selective Ligand for Type 2 CRF Receptors*	Vial	0.1 mg	18,000

1) S.Y. Hsu and A.J.W. Hsueh, *Nat. Med.*, **7**, 605 (2001). (*Original*)
2) F.M. Dautzenberg and R.L. Hauger, *Trends Pharmacol. Sci.*, **23**, 71 (2002). (*Review*)
3) V. Martínez, L. Wang, J.E. Rivier, W. Vale, and Y Taché, *J. Pharmacol. Exp. Ther.*, **301**, 611 (2002). (*Pharmacol.*)
4) A. Chanalaris, K.M. Lawrence, A. Stephanou, R.D. Knight, S.Y. Hsu, A.J.W. Hsueh, and D.S. Latchman, *J. Mol. Cell. Cardiol.*, **35**, 1295 (2003). (*Pharmacol.*)

4328-s -20℃	**Urocortin (Human)** Asp-Asn-Pro-Ser-Leu-Ser-Ile-Asp-Leu-Thr-Phe-His-Leu-Leu-Arg-Thr-Leu-Leu-Glu-Leu-Ala-Arg-Thr-Gln-Ser-Gln-Arg-Glu-Arg-Ala-Glu-Gln-Asn-Arg-Ile-Ile-Phe-Asp-Ser-Val-NH_2 (M.W. 4696.2) $C_{204}H_{337}N_{63}O_{64}$ [176591-49-4] *Ligand for Type 1 / Type 2 CRF Receptors*	Vial	0.1 mg	14,000

1) C.J. Donaldson, S.W. Sutton, M.H. Perrin, A.Z. Corrigan, K.A. Lewis, J.E. Rivier, J.M. Vaughan, and W.W. Vale, *Endocrinology*, **137**, 2167 (1996). (*Original; cDNA & Pharmacol.*)
2) D.P. Behan, O. Khongsaly, N. Ling, and E.B. De Souza, *Brain Res.*, **725**, 263 (1996). (*Biochem.*)
3) Y. Murakami, T. Mori, K. Koshimura, M. Kurosaki, T. Hori, N. Yanaihara, and Y. Kato, *Endocr. J.*, **44**, 627 (1997). (*Pharmacol.*)
4) K. Takahashi, K. Totsune, M. Sone, O. Murakami, F. Satoh, Z. Arihara, H. Sasano, K. Iino, and T. Mouri, *Peptides*, **19**, 643 (1998). (*Immunohistochem.*)

4327-s -20℃	**Urocortin (Rat)** **(Mouse)** Asp-Asp-Pro-Pro-Leu-Ser-Ile-Asp-Leu-Thr-Phe-His-Leu-Leu-Arg-Thr-Leu-Leu-Glu-Leu-Ala-Arg-Thr-Gln-Ser-Gln-Arg-Glu-Arg-Ala-Glu-Gln-Asn-Arg-Ile-Ile-Phe-Asp-Ser-Val-NH_2 (M.W. 4707.3) $C_{206}H_{338}N_{62}O_{64}$ [171543-83-2] *Ligand for Type 1 / Type 2 CRF Receptors*	Vial	0.1 mg	14,000

1) J. Vaughan, C. Donaldson, J. Bittencourt, M.H. Perrin, K. Lewis, S. Sutton, R. Chan, A.V. Turnbull, D. Lovejoy, C. Rivier, J. Rivier, P.E. Sawchenko, and W. Vale, *Nature*, **378**, 287 (1995). (*Original; cDNA & Pharmacol.*)
2) A.V. Turnbull, W. Vale, and C. Rivier, *Eur. J. Pharmacol.*, **303**, 213 (1996). (*Pharmacol.; Inhibition of Edema*)
3) M. Spina, E. Merlo-Pich, R.K.W. Chan, A.M. Basso, J. Rivier, W. Vale, and G.F. Koob, *Science*, **273**, 1561 (1996). (*Pharmacol.; Suppression of Appetite*)
4) L.Y. Zhao, C.J. Donaldson, G.W. Smith, and W.W. Vale, *Genomics*, **50**, 23 (1998). (*Nucleotide Seq.; Mouse*)

Stresscopin / Urocortin and Related Peptides (continued)

Code	Compound			Price:Yen
4383-s -20℃	**Urocortin II (Mouse)** Val-Ile-Leu-Ser-Leu-Asp-Val-Pro-Ile-Gly-Leu-Leu-Arg-Ile-Leu-Leu-Glu-Gln-Ala-Arg-Tyr-Lys-Ala-Ala-Arg-Asn-Gln-Ala-Ala-Thr-Asn-Ala-Gln-Ile-Leu-Ala-His-Val-NH_2 (M.W. 4152.9) $C_{187}H_{320}N_{56}O_{50}$	Vial	0.1 mg	14,000

Selective Ligand for Type 2 CRF Receptors

1) T.M. Reyes, K. Lewis, M.H. Perrin, K.S. Kunitake, J. Vaughan, C.A. Arias, J.B. Hogenesch, J. Gulyas, J. Rivier, W.W. Vale, and P.E. Sawchenko, *Proc. Natl. Acad. Sci. U.S.A.*, **98**, 2843 (2001). (*Original; Urocortin II*)
2) M. Million, C. Maillot, P. Saunders, J. Rivier, W. Vale, and Y. Taché, *Am. J. Physiol. Gastrointest. Liver Physiol.*, **282**, G34 (2002). (*Pharmacol.*)
3) C. Li, J. Vaughan, P.E. Sawchenko, and W.W. Vale, *J. Neurosci.*, **22**, 991 (2002). (*Histochem.*)
4) V. Martínez, L. Wang, J.E. Rivier, W. Vale, and Y. Taché, *J. Pharmacol. Exp. Ther.*, **301**, 611 (2002). (*Pharmacol.*)

Substance P and Related Peptides

1) D. Regoli, A. Boudon, and J.-L. Fauchere, *Pharmacol. Rev.*, **46**, 551 (1994). (*Review*)

Code	Compound			Price:Yen
4014-v -20℃	**Substance P*** **(Human, Bovine, Rat, Mouse)** Arg-Pro-Lys-Pro-Gln-Gln-Phe-Phe-Gly-Leu-Met-NH_2 (M.W. 1347.6) $C_{63}H_{98}N_{18}O_{13}S$ [33507-63-0]	Vial	0.5 mg	3,300
4014 -20℃	**Substance P*** **(Human, Bovine, Rat, Mouse)** Arg-Pro-Lys-Pro-Gln-Gln-Phe-Phe-Gly-Leu-Met-NH_2 • 3AcOH • $5H_2O$ (M.W. 1347.6 • 180.16 • 90.08) $C_{63}H_{98}N_{18}O_{13}S$ • $3CH_3COOH$ • $5H_2O$	Bulk	25 mg 100 mg	50,000 136,000

Purity Information : QP See page IV (XVI)

1) U.S. von Euler and J.H. Gaddum, *J. Physiol.*, **72**, 74 (1931). (*Naming*)
2) M.M. Chang, S.E. Leeman, and H.D. Niall, *Nature New Biol.*, **232**, 86 (1971). (*Original; Bovine*)
3) A.J. Harmar, A. Armstrong, J.C. Pascall, K. Chapman, R.Rosie, A. Curtis, J. Going, C.R.W. Edwards, and G. Fink, *FEBS Lett.*, **208**, 67 (1986). (*cDNA Seq.; Human*)

Code	Compound			Price:Yen
4172-v -20℃	**[D-Arg^1,D-Pro^2,D-Trp^{7,9},Leu^{11}]-Substance P** (Hydrochloride Form) D-Arg-D-Pro-Lys-Pro-Gln-Gln-D-Trp-Phe-D-Trp-Leu-Leu-NH_2 (M.W. 1497.8) $C_{75}H_{108}N_{20}O_{13}$ [84676-91-5]	Vial	0.5 mg	4,600
4172 -20℃	**[D-Arg^1,D-Pro^2,D-Trp^{7,9},Leu^{11}]-Substance P** D-Arg-D-Pro-Lys-Pro-Gln-Gln-D-Trp-Phe-D-Trp-Leu-Leu-NH_2 • 3HCl • $8H_2O$ (M.W. 1497.8 • 109.38 • 144.12) $C_{75}H_{108}N_{20}O_{13}$ • 3HCl • $8H_2O$	Bulk	25 mg	130,000

Purity Information : QP See page IV (XVI)

Bombesin Receptor Antagonist

1) R.T. Jensen, S.W. Jones, K. Folkers, and J.D. Gardner, *Nature*, **309**, 61 (1984). (*Original; Bombesin Antagonist*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Code	Compound			Price:Yen
4173-v -20℃	**[D-Arg^1,D-Trp^{7,9},Leu^{11}]-Substance P** **Spantide** (Hydrochloride Form) D-Arg-Pro-Lys-Pro-Gln-Gln-D-Trp-Phe-D-Trp-Leu-Leu-NH_2 (M.W. 1497.8) $C_{75}H_{108}N_{20}O_{13}$ [91224-37-2]	Vial	0.5 mg	4,600
4173 -20℃	**[D-Arg^1,D-Trp^{7,9},Leu^{11}]-Substance P** **Spantide** D-Arg-Pro-Lys-Pro-Gln-Gln-D-Trp-Phe-D-Trp-Leu-Leu-NH_2 • 3HCl • $8H_2O$ (M.W. 1497.8 • 109.38 • 144.12) $C_{75}H_{108}N_{20}O_{13}$ • 3HCl • $8H_2O$ Purity Information : QP See page IV (XVI) *Substance P Antagonist* 1) K. Folkers, R. Hákanson, J. Hörig, X. Jie-Cheng, and S. Leander, *Br. J. Pharmacol.*, **83**, 449 (1984). (*Original*)	Bulk	25 mg	130,000
4113-v -20℃	**[D-Pro^2,D-Trp^{7,9}]-Substance P** (Hydrochloride Form) Arg-D-Pro-Lys-Pro-Gln-Gln-D-Trp-Phe-D-Trp-Leu-Met-NH_2 (M.W. 1515.8) $C_{74}H_{106}N_{20}O_{13}S$ [80434-86-2]	Vial	0.5 mg	4,600
4113 -20℃	**[D-Pro^2,D-Trp^{7,9}]-Substance P** Arg-D-Pro-Lys-Pro-Gln-Gln-D-Trp-Phe-D-Trp-Leu-Met-NH_2 • 3HCl • $6H_2O$ (M.W. 1515.8 • 109.38 • 108.12) $C_{74}H_{106}N_{20}O_{13}S$ • 3HCl • $6H_2O$ Purity Information : QP See page IV (XVI) *Substance P Antagonist* 1) G. Engberg, T.H. Svensson, S. Rosell, and K. Folkers, *Nature*, **293**, 222 (1981). (*Original*)	Bulk	25 mg	130,000
4114-v -20℃	**[D-Pro^4,D-Trp^{7,9}]-Substance P (4-11)** D-Pro-Gln-Gln-D-Trp-Phe-D-Trp-Leu-Met-NH_2 (M.W. 1134.4) $C_{57}H_{75}N_{13}O_{10}S$ [81039-85-2] *Substance P Antagonist* 1) S. Caranikas, J. Mizrahi, P.D. Orleans-Juste, and D. Regoli, *Eur. J. Phamacol.*, **77**, 205 (1982). (*Original*)	Vial	0.5 mg	4,100
4059-v -20℃	**[Tyr^8]-Substance P*** Arg-Pro-Lys-Pro-Gln-Gln-Phe-Tyr-Gly-Leu-Met-NH_2 (M.W. 1363.6) $C_{63}H_{98}N_{18}O_{14}S$ [55614-10-3] Purity Information : Qx See page IV (XVI) *For Radioimmunoassay*	Vial	0.5 mg	4,900

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Tachykinins

List of Tachykinins

	Code	Compound	Quantity	Price: Yen	Page
NK_1 Receptor Selective Peptides					
Agonist					
	4014-v	**Substance P★**	0.5 mg vial	3,300	144
Antagonist					
	4173-v	**[D-Arg^1 D-Trp^{7,9} Leu^{11}]-Substance P (Spantide)★**	0.5 mg vial	4,600	145
	4113-v	**[D-Pro^2,D-Trp^{7,9}]-Substance P★**	0.5 mg vial	4,600	145
	4114-v	**[D-Pro^4,D-Trp^{7,9}]-Substance P (4-11)**	0.5 mg vial	4,100	145
for RIA					
	4059-v	**[Tyr^8]-Substance P**	0.5 mg vial	4,900	145 / 242
NK_2 Receptor Selective Agonist					
	4154-v	**Neurokinin A★**	0.5 mg vial	3,900	101
NK_3 Receptor Selective Agonist					
	4317-v	**Neurokinin B★**	0.5 mg vial	3,900	101
Other NK Receptor Ligand					
	4411-v	**Endokinin C (Human)**	0.5 mg vial	8,000	57
	4412-v	**Endokinin D (Human)**	0.5 mg vial	8,000	57
Non-Mammalian Tachykinins / Bombesin Related Peptides					
	4030-v	**Physalaemin★**	0.5 mg vial	3,300	125
	4003-v	**Eledoisin Related Peptide★**	0.5 mg vial	2,600	57
	4086-v	**Bombesin★**	0.5 mg vial	5,200	24
	4152-v	**Neuromedin B★**	0.5 mg vial	3,900	102
	4153-v	**Neuromedin C★**	0.5 mg vial	3,900	102

★ Other bulk packaging is available.

Tertiapin

Code	Compound			Price:Yen
4364-s	**Tertiapin**	Vial	0.1 mg	15,000

-20℃

(Honey Bee, *Apis mellifera*)

Ala-Leu-Cys-Asn-Cys-Asn-Arg-Ile-Ile-Ile-
Pro-His-Met-Cys-Trp-Lys-Lys-Cys-Gly-Lys-
Lys-NH_2

(Disulfide bonds between Cys^3-Cys^{14} and Cys^5-Cys^{18})

(M.W. 2455.1) $C_{106}H_{176}N_{34}O_{23}S_5$

Inward-Rectifier K^+ Channel Blocker

1) W. Jin and Z. Lu, *Biochemistry*, **37**, 13291 (1998). (*Original; Pharmacol.*)
2) X. Xu and J.W. Nelson, *Proteins Struct. Funct. Genet.*, **17**, 124 (1993). (*Structure; S-S Bond*)
3) H. Kitamura, M. Yokoyama, H. Akita, K. Matsushita, Y. Kurachi, and M. Yamada, *J. Pharmacol. Exp.Ther.*, **293**, 196 (2000). (*Pharmacol.*)
4) M.-D. Drici, S. Diochot, C. Terrenoire, G. Romey, and M.L. Lazdunski, *Br. J. Pharmacol.*, **131**, 569 (2000). (*Pharmacol.*)

Tityustoxin

Code	Compound			Price:Yen
4313-s -20℃	**Tityustoxin Kα** **TsTX-Kα** **(Scorpion, *Tityus serrulatus*)** Val-Phe-Ile-Asn-Ala-Lys-Cys-Arg-Gly-Ser- Pro-Glu-Cys-Leu-Pro-Lys-Cys-Lys-Glu-Ala- Ile-Gly-Lys-Ala-Ala-Gly-Lys-Cys-Met-Asn- Gly-Lys-Cys-Lys-Cys-Tyr-Pro (Reported disulfide bonds between Cys^{7}-Cys^{28}, Cys^{13}-Cys^{33}, and Cys^{17}-Cys^{35}) (M.W. 3941.7) $C_{168}H_{275}N_{49}O_{46}S_7$	Vial	0.1 mg	30,000

Voltage-Dependent K^+ Channel (A Channel) Blocker

1) T.R. Werkman, T.A. Gustafson, R.S. Rogowski, M.P. Blaustein, and M.A. Rogawski, *Mol. Pharmacol.*, **44**, 430 (1993). (*Original*)
2) R.S. Rogowski, B.K. Krueger, J.H. Collins, and M.P. Blaustein, *Proc. Natl. Acad. Sci. U.S.A.*, **91**, 1475 (1994). (*Pharmacol.*)
3) W.F. Hopkins, *J. Pharmacol. Exp. Ther.*, **285**, 1051 (1998). (*Pharmacol.*)
4) K.C. Ellis, T.C. Tenenholz, H. Jerng, M. Hayhurst, C.S. Dudlak, W.F. Gilly, M.P. Blaustein, and D.J. Weber, *Biochemistry*, **40**, 5942 (2001). (*S-S Bond*)

Thyrotropin Releasing Hormone (TRH)

Code	Compound			Price:Yen
4011-v -20℃	**TRH** **Thyrotropin Releasing Hormone** **(Human, Ovine, Porcine, Rat)** Pyr-His-Pro-NH_2 (M.W. 362.38) $C_{16}H_{22}N_6O_4$ [24305-27-9]	Vial	0.5 mg	1,900
4011 -20℃	**TRH** **Thyrotropin Releasing Hormone** **(Human, Ovine, Porcine, Rat)** Pyr-His-Pro-NH_2 • H_2O (M.W. 362.38 • 18.02) $C_{16}H_{22}N_6O_4$ • H_2O	Bulk	25 mg 100 mg	4,500 12,200

1) R. Burgus, T.F. Dunn, D. Desiderio, and R. Guillemin, *C.R. Acad. Sci. Paris*, **269**, 1870 (1969). (*Original; Ovine*)
2) J. Bøler, F. Enzman, K. Folkers, C.Y. Bowers, and A.V. Schally, *Biochem. Biophys. Res. Commun.*, **37**, 705 (1969). (*Original; Porcine*)
3) M. Yamada, S. Radovick, F.E. Wondisford, Y. Nakayama, B.D. Weintraub, and J.F. Wilber, *Mol. Endocrinol.*, **4**, 551 (1990). (*cDNA Seq.; Human*)

T-Kinin See Code 4130 **Isoleucyl-Seryl-Bradykinin** on page 28

TMRIA-K4 See Code 3401 on page 240

Tuftsin

Code	Compound			Price:Yen
4020-v -20℃	**Tuftsin** Thr-Lys-Pro-Arg (M.W. 500.59) $C_{21}H_{40}N_8O_6$ [9063-57-4]	Vial	0.5 mg	2,700
4020 -20℃	**Tuftsin** Thr-Lys-Pro-Arg • 2AcOH (M.W. 500.59 • 120.10) $C_{21}H_{40}N_8O_6$ • $2CH_3COOH$ [72103-53-8]	Bulk	25 mg 100 mg	12,000 36,000

Phagocytosis-Stimulating Peptide

1) K. Nishioka, A. Constantpoulos , P.S. Satoh, and V.A. Najjar, *Biochem. Biophys. Res. Commun.*, **47**, 172 (1972). (*Original*)
2) K. Nishioka, P.S. Satoh, A. Constantpoulos, and V.A. Najjar, *Biochim. Biophys. Acta*, **310**, 230 (1973). (*Chem. Synthesis & Pharmacol.*)

Urocortins

As for the details, see the section of **Stresscopin / Urocortin and Related Peptides** on pages 142 ～ 144

Code	Compound	Quantity	Price: Yen	Page
4328-s	**Urocortin (Human)**	0.1 mg vial	14,000	143
4327-s	**Urocortin (Rat)**	0.1 mg vial	14,000	143
4383-s	**Urocortin II (Mouse)**	0.1 mg vial	14,000	144

Uroguanylin See Code 4295 **Uroguanylin Isomer A (Human)** , Code 4354 **Uroguanylin (Rat)** and Code 4463 **Uroguanylin Isomer B (Human)** on pages 76～78

Urotensin II and Related Peptides

1) A.P. Davenport and J.J. Maguire, *Trends Pharmacol. Ther.*, **21**, 80 (2000). (*Review*)
2) K.L. Ong, K.S.L. Lam, and B.M.Y. Cheung, *Cardiovasc. Drug. Ther.*, **19**, 65 (2005). (*Review*)
3) T. Sugo and M. Mori, *Peptides*, **29**, 809 (2008). (*Review*)
4) K.L. Ong, L.Y.F. Wong, and B.M.Y. Cheung, *Peptides*, **29**, 859 (2008). (*Review*)
5) Z. Carmine and F. Mallamaci, *Curr. Opin. Nephrol. Hypertens.*, **17**, 199 (2008). (*Review*)
6) D. Guidolin, G. Albertin, and D. Ribatti, *Peptides*, **31**, 1219 (2010). (*Review*)

List of Urotensin II and Related Peptides

Code	Compound	Quantity	Price: Yen	Page
4365-v	**Urotensin II (Human)**	0.5 mg vial	20,000	below
4371-v	**Urotensin II (Rat)**	0.5 mg vial	20,000	149
4408-v	**Urotensin II-Related Peptide (Human)**	0.5 mg vial	12,000	149

Code	Compound			Price:Yen
4365-v	**Urotensin II (Human)**	Vial	0.5 mg	20,000

-20℃

UII
(Monkey)
(Hydrochloride Form)
Glu-Thr-Pro-Asp-Cys-Phe-Trp-Lys-Tyr-Cys-Val
(Disulfide bond between Cys^5-Cys^{10})
(M.W. 1388.6) $C_{64}H_{85}N_{13}O_{18}S_2$ [251293-28-4]
Purity Information : Q_E See page IV (XVI)

Potent Vasoconstrictor

1) Y. Coulouarn, I. Lihrmann, S. Jegou, Y. Anouar, H. Tostivint, J.C. Beauvillain, J.M. Conlon, H.A. Bern, and H. Vaudry, *Proc. Natl. Acad. Sci. U.S.A.*, **95**, 15803 (1998). (*Original*)
2) R.S. Ames, H.M. Sarau, J.K. Chambers, R.N. Willette, N.V. Aiyar, A.M. Romanic, C.S. Louden, J.J. Foley, C.F. Sauermelch, R.W. Coatney, Z. Ao, J. Disa, S.D. Holmes, J.M. Stadel, J.D. Martin, W.-S. Liu, G.I. Glover, S. Wilson, D.E. McNulty, C.E. Ellis, N.A. Elshourbagy, U. Shabon, J.J. Trill, D.W.P. Hay, E.H. Ohlstein, D.J. Bergsma, and S.A. Douglas, *Nature*, **401**, 282 (1999). (*Pharmacol.*)
3) M.R. MacLean, D. Alexander, A. Stirrat, M. Gallagher, S.A. Douglas, E.H. Ohlstein, I. Morecroft, and K. Polland, *Br. J. Pharmacol.*, **130**, 201 (2000). (*Pharmacol.*)
4) N.A. Elshourbagy, S.A. Douglas, U. Shabon, S. Harrison, G. Duddy, J.L. Sechler, Z. Ao, B.E. Maleeff., D. Naselsky, J. Disa, and N.V. Aiyar , *Br. J. Pharmacol.*, **136**, 9 (2002). (*Original; Monkey*)

Code	Compound			Price:Yen
4371-v -20℃	**Urotensin II (Rat)** **[Pyr^{110}]-Prepro-Urotensin II (Rat, 110-123)** Pyr-His-Gly-Thr-Ala-Pro-Glu-Cys-Phe-Trp-Lys-Tyr-Cys-Ile (Disulfide bond between Cys^{8}-Cys^{13}) (M.W. 1663.9) $C_{77}H_{102}N_{18}O_{20}S_2$ *Vasoconstrictor*	Vial	0.5 mg	20,000

Following the sequence determination of human urotensin II (U-II), the same group reported the corresponding rat peptide cDNA sequence. When we look at the deduced peptide sequence of rat prepro-U-II, there are two double basic sites at its C-terminal region, which might be the enzymatic cleavage sites for yielding the mature peptide of **Urotensin II (Rat)**. We chose the shorter peptide of 14 amino acid residues with pyroglutamic acid modification for Gln^{110} as the possible candidate for **Urotensin II (Rat)** and chemically synthesized it. Synthetic [Pyr^{110}]-prepro-U-II (110-123) was confirmed to have a vasoconstricting activity as potent as that of human peptide in the isolated thoracic aorta of rat. Cardiovascular activity of **Urotensin II (Rat)** and Urotensin II (Human) is also reported[2]. We, therefore, named this peptide as **Urotensin II (Rat)** in this catalog (putative naming only), although the native form of **Urotensin II (Rat)** remains to be identified.

1) Y. Coulouarn, S. Jégou, H. Tostivint, H. Vaudry, and I. Lihrmann, *FEBS Lett.*, **457**, 28 (1999). (*Original*)
2) S.M. Gardiner, J.E. March, P.A. Kemp, A.P. Davenport, and T. Bannett, *Br. J. Pharmacol.*, **132**, 1625 (2001). (*Pharmacol.*)

4408-v -20℃	**Urotensin II-Related Peptide (Human)** **(Rat, Mouse)** Ala-Cys-Phe-Trp-Lys-Tyr-Cys-Val (Disulfide bond between Cys^{2}-Cys^{7}) (M.W. 1017.2) $C_{49}H_{64}N_{10}O_{10}S_2$ [342878-90-4] *Endogenous Hypotensive Peptide*	Vial	0.5 mg	12,000

1) T. Sugo, Y. Murakami, Y. Shimomura, M. Harada, M. Abe, Y. Ishibashi, C. Kitada, N. Miyajima, N. Suzuki, M. Mori, and M. Fujino, *Biochem. Biophys. Res. Commun.*, **310**, 860 (2003). (*Original; Urotensin II-Related Peptide*)
2) M. Mori and M. Fujino, *Peptides*, **25**, 1815 (2004). (*Review*)

Vasoactive Intestinal Contractor See Code 4211 **VIC (Mouse)** on page 63

Vasoactive Intestinal Peptide (VIP)

Code	Compound			Price:Yen
4110-s -20℃	**VIP (Human, Porcine)** **Vasoactive Intestinal Peptide (Human, Porcine) (Bovine, Rat, Canine)** His-Ser-Asp-Ala-Val-Phe-Thr-Asp-Asn-Tyr-Thr-Arg-Leu-Arg-Lys-Gln-Met-Ala-Val-Lys-Lys-Tyr-Leu-Asn-Ser-Ile-Leu-Asn-NH_2 (M.W. 3325.8) $C_{147}H_{238}N_{44}O_{42}S$ [40077-57-4]	Vial	0.1 mg	9,500
4110-v -20℃	**VIP (Human, Porcine)** **Vasoactive Intestinal Peptide (Human, Porcine) (Bovine, Rat, Canine)** [40077-57-4]	Vial	0.5 mg	33,000

1) V. Mutt and S.I. Said, *Eur. J. Biochem.*, **42**, 581 (1974). (*Original; Porcine*)
2) N. Itoh, K. Obata, N. Yanaihara, and H. Okamoto, *Nature*, **304**, 547 (1983). (c*DNA Seq.; Human*)
3) R. Dimaline, J.R. Reeve, Jr., J.E. Shively, and D. Hawke, *Peptides*, **5**, 183 (1984). (*Original; Rat*)
4) S.C. Wang, B.H. Du, J. Eng, M. Chang, J.D. Hulmes, Y.-C.E. Pan, and R.S. Yalow, *Life Sci.*, **37**, 979 (1985). (*Original; Canine*)

Vasopressin, Vasotocin, and Related Peptides

1) B. Berde (ed.), Neurohypophysial Hormones and Similar Polypeptides, *Handbook of Experimental Pharmacology,* **Vol. 23**, Springer-Verlag, Berlin, 1968. (*Review*)

4085-v -20℃	**[Arg^8]-Vasopressin*** **(Human, Bovine, Ovine, Rat, Mouse)** Cys-Tyr-Phe-Gln-Asn-Cys-Pro-Arg-Gly-NH_2 (Disulfide bond between Cys^1-Cys^6) (M.W. 1084.2) $C_{46}H_{65}N_{15}O_{12}S_2$ [113-79-1]	Vial	0.5 mg	4,800

1) E.A. Popenoe and V. Du Vigneaud, *J. Biol. Chem.*, **205**, 133 (1953). (*Original; Bovine*)
2) A. Light and V. Du Vigneaud, *Proc. Soc. Exp. Biol. Med.*, **98**, 692 (1958). (*Original; Human*)
3) H. Schmale, S. Heinsohn and D. Richter, *EMBO J.*, **2**, 763 (1983). (*Nucleotide Seq.; Rat*)

4026-v -20℃	**[Asu^{1,6},Arg^8]-Vasopressin*** **Deamino-Dicarba-Arginine-Vasopressin** *cyclo*(Tyr-Phe-Gln-Asn-Asu)-Pro-Arg-Gly-NH_2 (Asu: L-α-Aminosuberic acid) (Cyclic form between Asu ω-carboxyl group and Tyr α-amino group) (M.W. 1033.1) $C_{48}H_{68}N_{14}O_{12}$ [40944-53-4] Purity Information : QX See page IV (XVI)	Vial	0.5 mg	5,700

1) S. Hase, S. Sakakibara, M. Wahrenburg, M. Kirchberger, I.L. Schwartz, and R. Walter, *J. Am. Chem. Soc.*, **94**, 3590 (1972). (*Original*)

4203-v -20℃	**[Pmp^1,Tyr(Me)^2]-Arg^8-Vasopressin*** Pmp-Tyr(Me)-Phe-Gln-Asn-Cys-Pro-Arg-Gly-NH_2 (Pmp: β-Mercapto-β,β-cyclopentamethylene propionic acid) (Tyr(Me): O-Methyl-L-tyrosine) (Disulfide bond between Pmp^1-Cys^6) (M.W. 1151.4) $C_{52}H_{74}N_{14}O_{12}S_2$ [73168-24-8] *Potent Arginine Vasopressin V_1 Antagonist*	Vial	0.5 mg	10,500

1) M. Kruszynski, B. Lammerk, M. Manning, J. Seto, J. Halder, and W.H. Sawyer, *J. Med. Chem.*, **23**, 364 (1980). (*Original*)

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Vasopressin, Vasotocin, and Related Peptides (continued)

Code	Compound			Price:Yen
4192-v -20℃	**[Arg^{8}]-Vasotocin*** **(Frog, Chicken)** Cys-Tyr-Ile-Gln-Asn-Cys-Pro-Arg-Gly-NH_2 (Disulfide bond between Cys^{1}-Cys^{6}) (M.W. 1050.2) $C_{43}H_{67}N_{15}O_{12}S_2$ [74927-14-3] 1) R. Acher, J. Chauvet, M.T. Lenci, F. Morel, and J. Maetz, *Biochim. Biophys. Acta*, **42**, 379 (1960). (*Original; Frog*) 2) J. Chauvet, M.T. Lenci, and R. Acher, *Biochim. Biophys. Acta*, **38**, 571 (1960). (*Original; Chicken*)	Vial	0.5 mg	4,800
4027-v -20℃	**[Asu^{1,6},Arg^{8}]-Vasotocin*** **Deamino-Dicarba-Arginine-Vasotocin** *cyclo*(Tyr-Ile-Gln-Asn-Asu)-Pro-Arg-Gly-NH_2 (Asu: L-α-Aminosuberic acid) (Cyclic form between Asu ω-carboxyl group and Tyr α-amino group) (M.W. 999.12) $C_{45}H_{70}N_{14}O_{12}$ [35375-13-4] 1) S. Hase, S. Sakakibara, M. Wahrenburg, M. Kirchberger, I.L. Schwartz, and R. Walter, *J. Am. Chem. Soc.*, **94**, 3590 (1972). (*Original*)	Vial	0.5 mg	5,700

VIC (Mouse) See Code 4211 on page 63

Virus Replication Inhibiting Peptide

Code	Compound			Price:Yen
4092 -20℃	**Virus Replication Inhibiting Peptide** Z-D-Phe-Phe-Gly (Z: Benzyloxycarbonyl) (M.W. 503.55) $C_{28}H_{29}N_3O_6$ [75539-79-6] 1) C.D. Richardson, A. Scheid, and P.W. Choppin, *Virology*, **105**, 205 (1980). (*Original*)	Bulk	25 mg 100 mg	7,800 16,000

Xenin

Code	Compound			Price:Yen
4279-v -20℃	**Xenin 25 (Human)** Met-Leu-Thr-Lys-Phe-Glu-Thr-Lys-Ser-Ala-Arg-Val-Lys-Gly-Leu-Ser-Phe-His-Pro-Lys-Arg-Pro-Trp-Ile-Leu (M.W. 2971.6) $C_{139}H_{224}N_{38}O_{32}S$ *Xenopsin Related Peptide* 1) G.E. Feurle, G. Hamscher, R. Kusiek, H.E. Meyer, and J.W. Metzger, *J. Biol. Chem.*, **267**, 22305 (1992). (*Original*)	Vial	0.5 mg	29,000

* The biological activity of these peptides is examined by the Division of Pharmacology, Peptide Institute, Inc.

Biologically Active Proteins

Lysenin

Code	Compound			Price:Yen
4802-v -20℃	**Lysenin** **(Earthworm, *Eisenia foetida*)** Natural product isolated from the coelomic fluid of earthworm Salt free lyophilized powder (M.W. 33 kDa) *Sphingomyelin-Specific Binding Protein*	Vial	50 µg	20,000

Lysenin is a sphingomyelin-specific binding protein without any cross reactions with other sphingolipids, such as sphingosine, ceramide and sphingosyl phosphocholine[1]. It was isolated from the coelomic fluid of the earthworm *Eisenia foetida* by Sekizawa *et al*. in 1996[2,3] and has a molecular size of 33 kDa as determined by size-exclusion chromatography[2]. It has hemolytic and smooth muscle-contracting activity[4] and lethal effects on mouse and *Xenopus* spermatozoa[5]. The lethal effects may be brought about by the interaction of lysenin with sphingomyelin present in the outer leaflets of plasma membranes of spermatozoa. It was shown that **lysenin** required cell surface sphingomyelin for its lytic activity on Chinese hamster ovary cells[6]. In combination with immunological techniques, it is possible to use **lysenin** as a tool for histochemical identification and tissue distribution studies of sphingomyelin[1,5]. In view of the involvement of ceramide, sphingosine, and sphingosine 1-phosphate, which are derived from sphingomyelin, in signal transduction, mitogenesis and apoptosis[7], **lysenin** may serve as a useful tool in elucidating specific reactions leading to defined cellular responses.

1) A. Yamaji, Y. Sekizawa, K. Emoto, H. Sakuraba, K. Inoue, H. Kobayashi, and M. Umeda, *J. Biol. Chem.*, **273**, 5300 (1998).
2) Y. Sekizawa, K. Hagiwara, T. Nakajima, and H. Kobayashi, *Biomed. Res.*, **17**, 197 (1996).
3) Y. Sekizawa, T. Kubo, H. Kobayashi, T. Nakajima, and S. Natori, *Gene*, **191**, 97 (1997).
4) H. Kobayashi, Y. Sekizawa, S. Shioda, S. Natori, T. Nakajima, and M. Umeda, *In, Neuroendocrinology-Retrospect and Perspectives* (H.-W. Korf and K.H. Usadel eds.), Springer, 1997, p. 255.
5) M. Ito, S. Abe, Y. Sekizawa, and H. Kobayashi, *Biomed. Res.*, **18**, 399 (1997).
6) K. Hanada, T. Hara, M. Fukasawa, A. Yamaji, M. Umeda, and M. Nishijima, *J. Biol. Chem.*, **273**, 33787 (1998).
7) L.R. Ballou, S.J.F. Laulederkind, E.F. Rosloniec, and R. Raghow, *Biochim. Biophys. Acta*, **1301**, 273 (1996).

- This product is produced by Zenyaku Kogyo Co., Ltd.

Midkines

Code	Compound			Price:Yen
4298-v -20℃	**Midkine (Human)** Amino Acid Sequence: See Page 94 (M.W. 13240.1) $C_{570}H_{915}N_{177}O_{167}S_{10}$ [170138-17-7] Synthetic Product *Heparin-Binding Growth / Differentiation Factor (Neurotrophic Factor, Neurite Outgrowth-Promoting Factor) Plasminogen Activator Activity Enhancer*	Vial	50 µg	30,000

1) J.-i. Tsutsui, K. Uehara, K. Kadomatsu, S. Matsubara, and T. Muramatsu, *Biochem. Biophys. Res. Commun.*, **176**, 792 (1991). (*Original*)
2) H. Muramatsu, T. Inui, T. Kimura, S. Sakakibara, X.-j. Song, H. Maruta, and T. Muramatsu, *Biochem. Biophys. Res. Commun.*, **203**, 1131 (1994). (*Pharmacol.*)
3) T. Inui, J. Bódi, S. Kubo, H. Nishio, T. Kimura, S. Kojima, H. Maruta, T. Muramatsu, and S. Sakakibara, *J. Peptide Sci.*, **2**, 28 (1996). (*Chem. Synthesis*)
4) G.S.P. Yu, J. Hu, and H. Nakagawa, *Neurosci. Lett.*, **254**, 128 (1998). (*Pharmacol.; Inhibition of β-amyloid cytotoxicity*)

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4299-s -20℃	**Midkine (Human, 60-121)** See Page 95	Vial	0.1 mg	30,000

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Pleiotrophin

4335-v -20℃	**Pleiotrophin (Human)** **PTN (Human)** Amino Acid Sequence: See Page 128 (M.W. 15302.6) $C_{658}H_{1079}N_{197}O_{198}S_{12}$ Synthetic Product *Heparin-Binding Growth Factor (Neurite Outgrowth-Promoting Factor)*	Vial	50 µg	30,000

1) Y.-S. Li, P.G. Milner, A.K. Chauhan, M.A. Watson, R.M. Hoffman, C.M. Kodner, J. Milbrandt, and T.F. Deuel, Science, **250**, 1690 (1990). (*Primary Structure*)
2) P.G. Milner, D. Shah, R. Veile, H. Donis-Keller, and B.V. Kumar, *Biochemistry*, **31**, 12023 (1992). (*Nucleotide Seq.; Human*)
3) F. Czubayko, A.M. Schulte, G.J. Berchem, and A. Wellstein, *Proc. Natl. Acad. Sci. U.S.A.*, **93**, 14753 (1996). (*Pharmacol.*)
4) T. Inui, M. Nakao, H. Nishio, Y. Nishiuchi, S. Kojima, T. Muramatsu, T. Kimura, and S. Sakakibara, *J. Pept. Res.*, **55**, 384 (2000). (*Chem. Synthesis & S-S Bond*)

Lists in this catalog

****** Biologically Active Peptides and Proteins ******

****** Enzyme Inhibitors and Substrates ******