Enzyme Substrates and Related Peptides

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Enzyme Substrates and Related Peptides

The purity grade of the following products is guaranteed according to our Purity Criteria on page III and IV (XIV and XV).

Code	Compound	Grade			Price:Yen
AAF-CMK	See Code 3202 **Ala-Ala-Phe-CH_2Cl** on page 182				
AAFP	See Code 3197 **4-Methoxyphenylazoformyl-Phe** on page 219				
3078 2～10℃	**Ac-Arg-OMe • HCl** Acetyl-L-arginine methyl ester monohydrochloride (M.W. 230.26 • 36.46) $C_9H_{18}N_4O_3$ • HCl [1784-05-0] *Substrate for C1r* 1) R.B. Sim, *In*, Proteolytic Enzymes Part C, *Methods in Enzymology*, **Vol. 80**, (L. Lorand, ed.), Academic Press, New York, 1981, pp. 26-42.	B		1 g 5 g	3,200 8,800
Ac-Asp-Asn-Leu-Asp-H (aldehyde)	See Code 3221 on page 178				
3220-v -20℃	**Ac-Asp-Asn-Leu-Asp-MCA** **[Ac-DNLD-MCA]** Acetyl-L-aspartyl-L-asparaginyl-L-leucyl-L-aspartic acid α-(4-methylcoumaryl-7-amide) (M.W. 674.66) $C_{30}H_{38}N_6O_{12}$ Synthetic Product *Selective Substrate for Caspase-3 Designed by in silico Screening System* 1) S. Tanuma, A. Yoshimori, and R. Takasawa, *Biol. Pharm. Bull.*, **27**, 968 (2004).	A	Vial	5 mg	7,000
Ac-Asp-Gln-Thr-Asp-H (aldehyde)	See Code 3194 on page 178				
3193-v -20℃	**Ac-Asp-Gln-Thr-Asp-MCA** **[Ac-DQTD-MCA]** Acetyl-L-aspartyl-L-gutaminyl-L-threonyl-L-aspartic acid α-(4-methylcoumaryl-7-amide) (M.W. 676.63) $C_{29}H_{36}N_6O_{13}$ *Substrate for Caspase-7/3* *(Deduced from the Cleavage Site of Focal Adhesion Kinase and Gelsolin)* 1) L.-P. Wen, J.A. Fahrni, S. Troie, J.-L. Guan, K. Orth, and G.D. Rosen, *J. Biol. Chem.*, **272**, 26056 (1997). 2) S. Kothakota, T. Azuma, C. Reinhard, A. Kippel, J. Tang, K. Chu, T.J. McGarry, M.W. Kirschner, K. Koths, D.J. Kwiatkowski, and L.T. Williams, *Science*, **278**, 294 (1997).	A	Vial	5 mg	9,000

Code	Compound	Grade			Price:Yen
Ac-Asp-Glu-Val-Asp-H (aldehyde) See Code 3172 on page 178					
3171-v -20℃	**Ac-Asp-Glu-Val-Asp-MCA** **[Ac-DEVD-MCA]** Acetyl-L-aspartyl-L-glutamyl-L-valyl-L-aspartic acid α-(4-methylcoumaryl-7-amide) (M.W. 675.64) $C_{30}H_{37}N_5O_{13}$ [169332-61-0] *Substrate for Caspase-3/7/8* 1) D.W. Nicholson, A. Ali, N.A. Thornberry, J.P. Vaillancourt, C.K. Ding, M. Gallant, Y. Gareau, P.R. Griffin, M. Labelle, Y.A. Lazebnik, N.A. Munday, S.M. Raju, M.E. Smulson, T.-T. Yamin, V.L. Yu, and D.K. Miller, *Nature*, **376**, 37 (1995). 2) N.A. Thornberry, T.A. Rano, E.P. Peterson, D.M. Rasper, T. Timkey, M. Garcia-Calvo, V.M. Houtzager, P.A. Nordstrom, S. Roy, J.P. Vaillancourt, K.T. Chapman, and D.W. Nicholson, *J. Biol. Chem.*, **272**, 17907 (1997).	A	Vial	5 mg	7,000
Ac-Asp-Met-Gln-Asp-H (aldehyde) See Code 3192 on page 179					
3227-v New -20℃	**Ac-Glu-Ser-Glu-Asn-MCA** **[Ac-ESEN-MCA]** Acetyl-L-glutamyl-L-seryl-L-glutamyl-L-asparagine α-(4-methylcoumaryl-7-amide) (M.W. 676.63) $C_{29}H_{36}N_6O_{13}$ *Substrate for Vacuolar Processing Enzyme (VPE)* 1) M. Kuroyanagi, M. Nishimura, and I. Hara-Nishimura, *Plant Cell Physiol.*, **43**, 143 (2002). 2) N. Hatsugai, M. Kuroyanagi, K. Yamada, T. Meshi, S. Tsuda, M. Kondo, M. Nishimura, and I. Hara-Nishimura, *Science*, **305**, 855 (2004). 3) M. Kuroyanagi, K. Yamada, N. Hatsugai, M. Kondo, M. Nishimura, and I. Hara-Nishimura, *J. Biol. Chem.*, **280**, 32914 (2005).	A	Vial	5 mg	10,000
3058 2～10℃	**Ac-Gly-Lys-OMe** • AcOH **[AGLME]** Acetylglycyl-L-lysine methyl ester (M.W. 259.30• 60.05) $C_{11}H_{21}N_3O_4$ • CH_3COOH [14752-92-2] *Substrate for u-PA (Urokinase) and C1s* 1) P.L. Walton, *Biochim. Biophys. Acta*, **132**, 104 (1967). 2) N. Miwa, Y. Obata, and A. Suzuki, *Biochem. Biophys. Res. Commun.*, **112**, 754 (1983). 3) R.B. Sim, *In*, Proteolytic Enzymes Part C, *Methods in Enzymology*, **Vol. 80**, (L. Lorand, ed.), Academic Press, New York, 1981, pp. 26-42.	A		0.1 g 1 g	2,200 8,300
Ac-Ile-Glu-Thr-Asp-H (aldehyde) See Code 3196 on page 179					
3195-v -20℃	**Ac-Ile-Glu-Thr-Asp-MCA** **[Ac-IETD-MCA]** Acetyl-L-isoleucyl-L-glutamyl-L-threonyl-L-aspartic acid α-(4-methylcoumaryl-7-amide) (M.W. 675.68) $C_{31}H_{41}N_5O_{12}$ *Substrate for Procaspase-3 Cleaving Enzyme (Caspase-8/6 and Granzyme B)* *(Deduced from the Cleavage Site of Procaspase-3)* 1) N.A. Thornberry, T.A. Rano, E.P. Peterson, D.M. Rasper, T. Timkey, M. Garcia-Calvo, V.M. Houtzager, P.A. Nordstrom, S. Roy, J.P. Vaillancourt, K.T. Chapman, and D.W. Nicholson, *J. Biol. Chem.*, **272**, 17907 (1997).	A	Vial	5 mg	10,000
Ac-Leu-Glu-His-Asp-H (aldehyde) See Code 3199 on page 179					

Code	Compound	Grade			Price:Yen
3198-v -20℃	**Ac-Leu-Glu-His-Asp-MCA** **[Ac-LEHD-MCA]** Acetyl-L-leucyl-L-glutamyl-L-histidyl-L-aspartic acid α-(4-methylcoumaryl-7-amide) (M.W. 711.72) $C_{33}H_{41}N_7O_{11}$ [292633-16-0] *Substrate for Caspase-9* 1) N.A. Thornberry, T.A. Rano, E.P. Peterson, D.M. Rasper, T. Timkey, M. Garcia-Calvo, V.M. Houtzager, P.A. Nordstrom, S. Roy, J.P. Vaillancourt, K.T. Chapman, and D.W. Nicholson, *J. Biol. Chem.*, **272**, 17907 (1997).	A	Vial	5 mg	10,000
3185-v -20℃	**Ac-Lys-Thr-Lys-Gln-Leu-Arg-MCA** **[Ac-KTKQLR-MCA]** Acetyl-L-lysyl-L-threonyl-L-lysyl-L-glutaminyl-L-leucyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 972.14) $C_{45}H_{73}N_{13}O_{11}$ *Substrate for Hepatocyte Growth Factor-Activator (HGF-A)* 1) K. Mizuno, Y. Tanoue, I. Okano, T. Harano, K. Takada, and T. Nakamura, *Biochem. Biophys. Res. Commun.*, **198**, 1161 (1994).	AA	Vial	5 mg	12,000
3006 2～10℃	**Ac-Phe-OEt** Acetyl-L-phenylalanine ethyl ester (M.W. 235.28) $C_{13}H_{17}NO_3$ [2361-96-8]	AA		0.1 g 1 g 5 g	1,600 2,300 5,000
3034 2～10℃	**Ac-Trp-OEt** Acetyl-L-tryptophan ethyl ester (M.W. 274.32) $C_{15}H_{18}N_2O_3$ [2382-80-1]	AA		0.1 g 1 g	1,800 4,600
Ac-Trp-Glu-His-Asp-H (aldehyde) See Code 3187 on page 180					
3186-v -20℃	**Ac-Trp-Glu-His-Asp-MCA** **[Ac-WEHD-MCA]** Acetyl-L-tryptophyl-L-glutamyl-L-histidyl-L-aspartic acid α-(4-methylcoumaryl-7-amide) (M.W. 784.77) $C_{38}H_{40}N_8O_{11}$ [189275-74-9] *Substrate for Caspase-1/14* 1) T.A. Rano, T. Timkey, E.P. Peterson, J. Rotonda, D.W. Nicholson, J.W. Becker, K.T. Chapman, and N.A. Thornberry, *Chem. Biol.*, **4**, 149 (1997). 2) N.A. Thornberry, T.A. Rano, E.P. Peterson, D.M. Rasper, T. Timkey, M.Garcia-Calvo, V.M. Houtzager, P.A. Nordstrom, S. Roy, J.P. Vaillancourt, K.T. Chapman, and D.W. Nicholson, *J. Biol. Chem.*, **272**, 17907 (1997). 3) J. Mikolajczyk, F.L. Scott, S. Krajewski, D.P. Sutherlin, and G.S. Salvesen, *Biochemistry*, **43**, 10560 (2004).	A	Vial	5 mg	10,000
3009 2～10℃	**Ac-Tyr-NH_2** Acetyl-L-tyrosine amide (M.W. 222.24) $C_{11}H_{14}N_2O_3$ [1948-71-6]	A		0.1 g 1 g	1,700 3,300

Code	Compound	Grade			Price:Yen
3008 2～10℃	**Ac-Tyr-OEt • H_2O** Acetyl-L-tyrosine ethyl ester monohydrate (M.W. 251.28 • 18.02) $C_{13}H_{17}NO_4 • H_2O$ [840-97-1]	AA		0.1 g 1 g	1,700 2,600

Substrate for Chymotrypsin and C1s

1) P.E. Wilcox, *In*, Proteolytic Enzymes, *Methods in Enzymology*, **Vol. 19**, (G.E. Perlmann and L. Lorand, eds.), Academic Press, New York, 1970, pp. 64-108.
2) R.B. Sim, *In*, Proteolytic Enzymes Part C, *Methods in Enzymology*, **Vol. 80**, (L. Lorand, ed.), Academic Press, New York, 1981, pp. 26-42.

Ac-Tyr-Val-Ala-Asp-CH_2Cl See Code 3180 on page 180

Ac-Tyr-Val-Ala-Asp-H (aldehyde) See Code 3165 on page 180

Code	Compound	Grade			Price:Yen
3161-v -20℃	**Ac-Tyr-Val-Ala-Asp-MCA** **[Ac-YVAD-MCA]** Acetyl-L-tyrosyl-L-valyl-L-alanyl-L-aspartic acid α-(4-methylcoumaryl-7-amide) (M.W. 665.69) $C_{33}H_{39}N_5O_{10}$ [149231-65-2]	A	Vial	5 mg	7,000

Substrate for Caspase-1

1) N.A. Thornberry, H.G. Bull, J.R. Calaycay, K.T. Chapman, A.D. Howard, M.J. Kostura, D.K. Miller, S.M. Molineaux, J.R. Weidner, J. Aunins, K.O. Elliston, J.M. Ayala, F.J. Casano, J. Chin, G.J.-F. Ding, L.A. Egger, E.P. Gaffney, G. Limjuco, O.C. Palyha, S.M. Raju, A.M. Rolando, J.P. Salley, T.-T. Yamin, T.D. Lee, J.E. Shively, M. MacCross, R.A. Mumford, J.A. Schmidt, and M.J. Tocci, *Nature*, **356**, 768 (1992).

Code	Compound	Grade			Price:Yen
3146 2～10℃	**Ac-Tyr-Val-Gly** Acetyl-L-tyrosyl-L-valylglycine (M.W. 379.41) $C_{18}H_{25}N_3O_6$	AA		0.1 g 1 g	7,800 54,400

Substrate for α-Amidating Enzyme

Ac-Tyr-Val-Lys-Asp-H (aldehyde) See Code 3166 on page 181

Ac-Val-Asp-Val-Ala-Asp-H (aldehyde) See Code 3204 on page 181

Code	Compound	Grade			Price:Yen
3203-v -20℃	**Ac-Val-Asp-Val-Ala-Asp-MCA** **[Ac-VDVAD-MCA]** Acetyl-L-valyl-L-aspartyl-L-valyl-L-alanyl-L-aspartic acid α-(4-methylcoumaryl-7-amide) (M.W. 716.74) $C_{33}H_{44}N_6O_{12}$	A	Vial	5 mg	10,000

Substrate for Caspase-2

1) R.V. Talanian, C. Quinlan, S. Trautz, M.C. Hackett, J.A. Mankovich, D. Banach, T. Ghayur, K.D. Brady, and W.W. Wong, *J. Biol. Chem.*, **272**, 9677 (1997).

Ac-Val-Glu-Ile-Asp-H (aldehyde) See Code 3182 on page 181

Code	Compound	Grade			Price:Yen
3181-v -20℃	**Ac-Val-Glu-Ile-Asp-MCA** **[Ac-VEID-MCA]** Acetyl-L-valyl-L-glutamyl-L-isoleucyl-L-aspartic acid α-(4-methylcoumaryl-7-amide) (M.W. 673.71) $C_{32}H_{43}N_5O_{11}$ [219137-97-0]	A	Vial	5 mg	7,000

Substrate for Caspase-6

1) A. Takahashi, P.J. Goldschmidt-Clermont, E.S. Alnemri, T. Fernandes-Alnemri, K. Yoshizawa-Kumagaye, K. Nakajima, M. Sasada, G.G. Poirier, and W.C. Earnshaw, *Exp. Cell Res.*, **231**, 123 (1997).
2) A. Takahashi, H. Hirata, S. Yonehara, Y. Imai, K-K. Lee, R.W. Moyer, P.C. Turner, P.W. Mesner, T. Okazaki, H. Sawai, S. Kishi, K. Yamamoto, M. Okuma, and M. Sasada, *Oncogene*, **14**, 2741 (1997).

AGLME See Code 3058 **Ac-Gly-Lys-OMe** • AcOH on page 205

Ala-Ala-Phe-CH_2Cl See Code 3202 on page 182

Code	Compound	Grade			Price:Yen
3201-v -20℃	**Ala-Ala-Phe-MCA** (Hydrochloride Form) L-Alanyl-L-alanyl-L-phenylalanine 4-methylcoumaryl-7-amide (M.W. 464.51) $C_{25}H_{28}N_4O_5$ [62037-41-6] *Substrate for Tripeptidyl Peptidase II (Component of Giant Protease with Some Proteasome Function)* 1) R. Glas, M. Bogyo, J.S. McMaster, M. Gaczynska, and H.L. Ploegh, *Nature*, **392,** 618 (1998). 2) E. Geier, G. Pfeifer, M. Wilm, M. Lucchiari-Hartz, W. Baumeister, K. Eichmann, and G. Niedermann, *Science*, **283**, 978 (1999).	AA	Vial	5 mg	4,000
4166 -20℃	**Ala-Arg-Gly-Ile-Lys-Gly-Ile-Arg-Gly-Phe-Ser-Gly** • 3AcOH • $5H_2O$ **[Lysine Hydroxylase Substrate L-1]** (M.W. 1218.4 • 180.16 • 90.08) $C_{53}H_{91}N_{19}O_{14}$ • $3CH_3COOH$ • $5H_2O$ *Substrate for Lysine Hydroxylase* 1) K.I. Kivirikko, K. Shudo, S. Sakakibara, and D.J. Prockop, *Biochemistry*, **11**, 122 (1972).	AA		25 mg	46,000
3147-v -20℃	**Ala-MCA** (Tosylate Form) L-Alanine 4-methylcoumaryl-7-amide (M.W. 246.26) $C_{13}H_{14}N_2O_3$ [77471-41-1] *Substrate for Aminopeptidase*	AA	Vial	5 mg	2,700
3068 2～10℃	**Ala-*p*NA** L-Alanine *p*-nitroanilide (M.W. 209.20) $C_9H_{11}N_3O_3$ [1668-13-9] *Substrate for Aminopeptidase* 1) G. Peleiderer, *In*, Proteolytic Enzymes, *Methods in Enzymology*, **Vol. 19**, (G.E. Perlmann and L. Lorand, eds.), Academic Press, New York, 1970, pp. 514-521.	AA		0.1 g 1 g 5 g	2,100 6,400 27,200
3085 2～10℃	**β-Alanyl-L-Histidine** **[Carnosine]** (M.W. 226.23) $C_9H_{14}N_4O_3$ [305-84-0]	AA		1 g 5 g	2,800 6,800
3099-v -20℃	**AMC** 7-Amino-4-methylcoumarin (M.W. 175.18) $C_{10}H_9NO_2$ [26093-31-2] *Reference Compound for Analysis with Peptidyl-MCAs*	AA	Vial	5 mg	2,000
4184-v -20℃	**Arg-Arg-Leu-Ile-Glu-Asp-Ala-Glu-Tyr-Ala-Ala-Arg-Gly** **[RR-SRC]** (M.W. 1519.7) $C_{64}H_{106}N_{22}O_{21}$ [81156-93-6] *Substrate for Tyrosine Protein-Kinase* 1) J.E. Casnellie, M.L. Harrison, L.J. Pike, K.E. Hellström, and E.G. Krebs, *Proc. Natl. Acad. Sci. U.S.A.*, **79**, 282 (1982).	AA	Vial	0.5 mg	7,200

Code	Compound	Grade			Price:Yen
3113-v -20℃	**Arg-MCA** (Hydrochloride Form) L-Arginine 4-methylcoumaryl-7-amide (M.W. 331.37) $C_{16}H_{21}N_5O_3$ [65286-27-3] *Substrate for Cathepsin H* 1) Y. Kanaoka, T. Takahashi, H. Nakayama, K. Takada, T. Kimura, and S. Sakakibara, *Chem. Pharm. Bull.*, **25**, 3126 (1977).	AA	Vial	5 mg	3,500
4133-v -20℃	**Asp-Arg-Val-Tyr-Ile-His-Pro-Phe-His-Leu-Val-Ile-His** (M.W. 1645.9) $C_{79}H_{116}N_{22}O_{17}$ [82048-97-3] *Substrate for Renin* 1) D.A. Tewksbury, R.A. Dart, and J. Travis, *Biochem. Biophys. Res. Commun.*, **99**, 1311 (1981).	A	Vial	0.5 mg	4,300
BAEE See Code 3001 **Bz-Arg-OEt • HCl** on page 213					
DL-BAPA See Code 3013 **Bz-DL-Arg-*p*NA • HCl** on page 213					
L-BAPA See Code 3057 **Bz-L-Arg-*p*NA • HCl** on page 214					
Biotinyl-Asp-Glu-Val-Asp-H (aldehyde) See Code 3173 on page 239					
Biotinyl-ω-Agatoxin IVA See Code 3402 on page 239					
3144-v -20℃	**Boc-Ala-Gly-Pro-Arg-MCA** *t*-Butyloxycarbonyl-L-alanylglycyl-L-prolyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 656.73) $C_{31}H_{44}N_8O_8$ [118850-78-5] *Substrate for ANP(Rat) Precursor Processing Enzyme* 1) T. Imada, R. Takayanagi, and T. Inagami, *Biochem. Biophys. Res. Commun.*, **143**, 587 (1987). 2) T. Imada, R. Takayanagi, and T. Inagami, *Biol. Chem. Hoppe-Seyler Suppl.*, **369**, 113 (1988).	A	Vial	5 mg	5,700
3155-v -20℃	**Boc-Arg-Val-Arg-Arg-MCA** *t*-Butyloxycarbonyl-L-arginyl-L-valyl-L-arginyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 842.99) $C_{38}H_{62}N_{14}O_8$ *Substrate for Furin* 1) K. Hatsuzawa, K. Murakami, and K. Nakayama, *J. Biochem.*, **111**, 296 (1992). 2) K. Hatsuzawa, M. Nagahara, S. Takahashi, K. Takada, K. Murakami, and K. Nakayama, *J. Biol. Chem.*, **267**, 16094 (1992).	A	Vial	5 mg	6,300
3139-v -20℃	**Boc-Asp(OBzl)-Pro-Arg-MCA** *t*-Butyloxycarbonyl-[(2*S*)-2-amino-3-(benzyloxycarbonyl)propionyl]-L-prolyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 733.81) $C_{37}H_{47}N_7O_9$ [113866-00-5] *Substrate for α-Thrombin* 1) S. Kawabata, T. Miura, T. Morita, H. Kato, K. Fujikawa, S. Iwanaga, K. Takada, T. Kimura, and S. Sakakibara, *Eur. J. Biochem.*, **172**, 17 (1988).	AA	Vial	5 mg	5,000

Code	Compound	Grade			Price:Yen
3135-v -20℃	**Boc-Gln-Ala-Arg-MCA** *t*-Butyloxycarbonyl-L-glutaminyl-L-alanyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 630.69) $C_{29}H_{42}N_8O_8$ [113866-20-9] *Substrate for Trypsin* 1) S. Kawabata, T. Miura, T. Morita, H. Kato, K. Fujikawa, S. Iwanaga, K. Takada, T. Kimura, and S. Sakakibara, *Eur. J. Biochem.*, **172**, 17 (1988).	A	Vial	5 mg	5,000
3122-v -20℃	**Boc-Gln-Arg-Arg-MCA** *t*-Butyloxycarbonyl-L-glutaminyl-L-arginyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 715.80) $C_{32}H_{49}N_{11}O_8$ [109376-05-8] *Substrate for Carboxyl Side of Paired Basic Residue Cleaving Enzyme* 1) K. Mizuno, T. Nakamura, K. Takada, S. Sakakibara, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **144**, 807 (1987).	A	Vial	5 mg	5,400
3136-v -20℃	**Boc-Gln-Gly-Arg-MCA** *t*-Butyloxycarbonyl-L-glutaminylglycyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 616.67) $C_{28}H_{40}N_8O_8$ *Substrate for Factor XIIa* 1) S. Kawabata, T. Miura, T. Morita, H. Kato, K. Fujikawa, S. Iwanaga, K. Takada, T. Kimura, and S. Sakakibara, *Eur. J. Biochem.*, **172**, 17 (1988).	A	Vial	5 mg	5,000
3151 2～10℃	**Boc-Gln-Pro** *t*-Butyloxycarbonyl-L-glutaminyl-L-proline (M.W. 343.38) $C_{15}H_{25}N_3O_6$ [2419-99-0] *Substrate for Peptidoglutaminase* 1) J.S. Hamada and W.E. Marshall, *J. Food Sci.*, **53**, 1132 (1988).	AA		0.1 g 1 g	3,200 15,000
3105-v -20℃	**Boc-Glu-Lys-Lys-MCA** *t*-Butyloxycarbonyl-L-glutamyl-L-lysyl-L-lysine 4-methylcoumaryl-7-amide (M.W. 660.76) $C_{32}H_{48}N_6O_9$ [73554-85-5] *Substrate for Plasmin* 1) H. Kato, N. Adachi, Y. Ohno, S. Iwanaga, K. Takada, and S. Sakakibara, *J. Biochem.*, **88**, 183 (1980).	A	Vial	5 mg	6,000
3134-v -20℃	**Boc-Glu(OBzl)-Ala-Arg-MCA** *t*-Butyloxycarbonyl-[(2*S*)-2-amino-4-(benzyloxycarbonyl)butanoyl]-L-alanyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 721.80) $C_{36}H_{47}N_7O_9$ [113866-16-3] *Substrate for Factor XIa* 1) S. Kawabata, T. Miura, T. Morita, H. Kato, K. Fujikawa, S. Iwanaga, K. Takada, T. Kimura, and S. Sakakibara, *Eur. J. Biochem.*, **172**, 17 (1988).	AA	Vial	5 mg	5,000

Code	Compound	Grade			Price:Yen
3115-v -20℃	**Boc-Glu(OBzl)-Gly-Arg-MCA** (Hydrochloride Form) *t*-Butyloxycarbonyl-[(2*S*)-2-amino-4-(benzyloxycarbonyl)butanoyl]glycyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 707.77) $C_{35}H_{45}N_7O_9$ [73554-94-6] 1) S. Iwanaga, T. Morita, H. Kato, T. Harada, N. Adachi, T. Sugo, I. Maruyama, K. Takada, T. Kimura, and S. Sakakibara, *In, KININS-II: Biochemistry, Pathophysiology, and Clinical Aspects*, (S. Fujii, H. Moriya, and T. Suzuki eds.), Plenum Publishing Co., 1979, pp.147-163. 2) S. Kawabata, T. Miura, T. Morita, H. Kato, K. Fujikawa, S. Iwanaga, K. Takada, T. Kimura, and S. Sakakibara, *Eur. J. Biochem.*, **172**, 17 (1988).	A	Vial	5 mg	5,000
3142-v -20℃	**Boc-Gly-Arg-Arg-MCA** *t*-Butyloxycarbonylglycyl-L-arginyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 644.72) $C_{29}H_{44}N_{10}O_7$ [113866-14-1] *Substrate for Carboxyl Side of Paired Basic Residue Cleaving Enzyme* 1) K. Mizuno, T. Nakamura, K. Takada, S. Sakakibara, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **144**, 807 (1987).	A	Vial	5 mg	5,400
3143-v -20℃	**Boc-Gly-Lys-Arg-MCA** *t*-Butyloxycarbonylglycyl-L-lysyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 616.71) $C_{29}H_{44}N_8O_7$ [109358-48-7] *Substrate for Carboxyl Side of Paired Basic Residue Cleaving Enzyme* 1) K. Mizuno, T. Nakamura, K. Takada, S. Sakakibara, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **144**, 807 (1987).	A	Vial	5 mg	5,700
3094-v -20℃	**Boc-Ile-Glu-Gly-Arg-MCA** *t*-Butyloxycarbonyl-L-isoleucyl-L-glutamylglycyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 730.81) $C_{34}H_{50}N_8O_{10}$ [65147-06-0] *Substrate for Factor Xa* 1) T. Morita, H. Kato, S. Iwanaga, K. Takada, T. Kimura, and S. Sakakibara, *J. Biochem.*, **82**, 1495 (1977).	A	Vial	5 mg	5,400
3140-v -20℃	**Boc-Leu-Arg-Arg-MCA** *t*-Butyloxycarbonyl-L-leucyl-L-arginyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 700.83) $C_{33}H_{52}N_{10}O_7$ *Substrate for Carboxyl Side of Paired Basic Residue Cleaving Enzyme and Proteasome* 1) K. Mizuno, T. Nakamura, K. Takada, S. Sakakibara, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **144**, 807 (1987). 2) M. Aki, N. Shimbara, M. Takashina, K. Akiyama, S. Kagawa, T. Tamura, N. Tanahashi, T. Yoshimura, K. Tanaka, and A. Ichihara, *J. Biochem.*, **115**, 257 (1994).	A	Vial	5 mg	5,400
3102-v -20℃	**Boc-Leu-Gly-Arg-MCA** (Hydrochloride Form) *t*-Butyloxycarbonyl-L-leucylglycyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 601.69) $C_{29}H_{43}N_7O_7$ [65147-09-3] *Substrate for Horseshoe Crab Clotting Enzyme* 1) S. Iwanaga, T. Morita, T. Harada, S. Nakamura, M. Niwa, K. Takada, T. Kimura, and S. Sakakibara, *Haemostasis*, **7**, 183 (1978).	AA	Vial	5 mg	5,000

Code	Compound	Grade			Price:Yen
3141-v -20℃	**Boc-Leu-Lys-Arg-MCA** *t*-Butyloxycarbonyl-L-leucyl-L-lysyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 672.82) $C_{33}H_{52}N_8O_7$ [109358-47-6] *Substrate for Carboxyl Side of Paired Basic Residue Cleaving Enzyme* 1) K. Mizuno, T. Nakamura, K. Takada, S. Sakakibara, and H. Matsuo, *Biochem. Biophys. Res. Commun.*, **144**, 807 (1987).	A	Vial	5 mg	5,700
3112-v -20℃	**Boc-Leu-Ser-Thr-Arg-MCA** *t*-Butyloxycarbonyl-L-leucyl-L-seryl-L-threonyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 732.82) $C_{34}H_{52}N_8O_{10}$ [73554-93-5] *Substrate for Activated Protein C* 1) Y. Ohno, H. Kato, T. Morita, S. Iwanaga, K. Takada, S. Sakakibara, and J. Stenflo, *J. Biochem.*, **90**, 1387 (1981).	A	Vial	5 mg	6,000
3125 2～10℃	**Boc-Leu-Ser-Thr-Arg-*p*NA** *t*-Butyloxycarbonyl-L-leucyl-L-seryl-L-threonyl-L-arginine *p*-nitroanilide (M.W. 695.76) $C_{30}H_{49}N_9O_{10}$ *Substrate for Activated Protein C*	A		25 mg 100 mg	20,000 60,000
3106-v -20℃	**Boc-Leu-Thr-Arg-MCA** *t*-Butyloxycarbonyl-L-leucyl-L-threonyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 645.75) $C_{31}H_{47}N_7O_8$ *Substrate for Factor VIIa-Tf* 1) Y. Shigematsu, T. Miyata, S. Higashi, T. Miki, J.E. Sadler, and S. Iwanaga, *J. Biol. Chem.*, **267**, 21329 (1992).	A	Vial	5 mg	5,000
3107-v -20℃	**Boc-Phe-Ser-Arg-MCA** *t*-Butyloxycarbonyl-L-phenylalanyl-L-seryl-L-arginine 4-methylcoumaryl-7-amide (M.W. 665.74) $C_{33}H_{43}N_7O_8$ [73554-90-2] *Substrate for Trypsin, Tryptase, 73K Protease, and Arg-Gingipain* 1) S. Iwanaga, T. Morita, H. Kato, T. Harada, N. Adachi, T. Sugo, I. Maruyama, K. Takada, T. Kimura, and S. Sakakibara, *In, KININS-II: Biochemistry, Pathophysiology, and Clinical Aspects*, (S. Fujii, H. Moriya, and T. Suzuki eds.), Plenum Publishing Co., 1979, pp.147-163. 2) M. Muramatsu, T. Itoh, M. Takei, and K. Endo, *Biol. Chem. Hoppe-Seyler*, **369**, 617 (1988). 3) A. Molla, T. Yamamoto, and H. Maeda, *J. Biochem.*, **104**, 616 (1988).	AA	Vial	5 mg	5,000
3104-v -20℃	**Boc-Val-Leu-Lys-MCA** *t*-Butyloxycarbonyl-L-valyl-L-leucyl-L-lysine 4-methylcoumaryl-7-amide (M.W. 615.76) $C_{32}H_{49}N_5O_7$ [73554-84-4] *Substrate for Plasmin and Calpain* 1) H. Kato, N. Adachi, Y. Ohno, S. Iwanaga, K. Takada, and S. Sakakibara, *J. Biochem.*, **88**, 183 (1980). 2) T. Sasaki, T. Kikuchi, N. Yumoto, N. Yoshimura, and T. Murachi, *J. Biol. Chem.*, **259**, 12489 (1984).	A	Vial	5 mg	5,700

Code	Compound	Grade			Price:Yen
3093-v -20℃	**Boc-Val-Pro-Arg-MCA** *t*-Butyloxycarbonyl-L-valyl-L-prolyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 627.73) $C_{31}H_{45}N_7O_7$ [65147-04-8] *Substrate for α-Thrombin* 1) T. Morita, H. Kato, S. Iwanaga, K. Takada, T. Kimura, and S. Sakakibara, *J. Biochem.*, **82**, 1495 (1977). 2) S. Kawabata, T. Morita, S. Iwanaga, and H. Igarashi, *J. Biochem.*, **97**, 1073 (1985).	AA	Vial	5 mg	4,800
3084 2～10℃	**Bz-Ala-OMe** Benzoyl-L-alanine methyl ester (M.W. 207.23) $C_{11}H_{13}NO_3$ [7244-67-9]	AA		0.1 g 1 g	1,900 5,200
3092-v -20℃	**Bz-Arg-MCA** (Hydrochloride Form) Benzoyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 435.48) $C_{23}H_{25}N_5O_4$ [83701-04-6] *Substrate for Trypsin* 1) Y. Kanaoka, T. Takahashi, H. Nakayama, K. Takada, T. Kimura, and S. Sakakibara, *Chem. Pharm. Bull.*, **25**, 3126 (1977).	A	Vial	5 mg	3,500
3002 2～10℃	**Bz-Arg-NH_2 • HCl • H_2O** Benzoyl-L-arginine amide monohydrochloride monohydrate (M.W. 277.32 • 36.46 • 18.02) $C_{13}H_{19}N_5O_2$ • HCl • H_2O [4299-03-0] *Substrate for Trypsin* 1) K.A. Walsh, *In*, Proteolytic Enzymes, *Methods in Enzymology*, **Vol. 19**, (G.E. Perlmann and L. Lorand, eds.), Academic Press, New York, 1970, pp. 41-63.	AA		1 g 5 g	2,700 6,900
3001 2～10℃	**Bz-Arg-OEt • HCl** **[BAEE]** Benzoyl-L-arginine ethyl ester monohydrochloride (M.W. 306.36 • 36.46) $C_{15}H_{22}N_4O_3$ • HCl [2645-08-1] *Substrate for Trypsin* 1) K.A. Walsh, *In*, Proteolytic Enzymes, *Methods in Enzymology*, **Vol. 19**, (G.E. Perlmann and L. Lorand, eds.), Academic Press, New York, 1970, pp. 41-63.	A		1 g 5 g 25 g	2,200 4,400 17,000
3013 2～10℃	**Bz-DL-Arg-*p*NA • HCl** **[DL-BAPA]** Benzoyl-DL-arginine *p*-nitroanilide monohydrochloride (M.W. 398.42 • 36.46) $C_{19}H_{22}N_6O_4$•HCl [911-77-3] *Substrate for Trypsin-like Proteases* 1) K.A. Thomas and R.A. Bradshaw, *In*, Proteolytic Enzymes Part C, *Methods in Enzymology*, **Vol. 80**, (L. Lorand, ed.), Academic Press, New York, 1981, pp. 609-620. 2) G.A. Grant, A.Z. Eisen, and R.A. Bradshaw, *In*, Proteolytic Enzymes Part C, *Methods in Enzymology*, **Vol. 80**, (L. Lorand, ed.), Academic Press, New York, 1981, pp. 722-734.	A		0.1 g 1 g 5 g	1,700 3,800 11,800

Code	Compound	Grade		Price:Yen
3057 2～10℃	**Bz-L-Arg-*p*NA • HCl** **[L-BAPA]** Benzoyl-L-arginine *p*-nitroanilide monohydrochloride (M.W. 398.42 • 36.46) $C_{19}H_{22}N_6O_4$ • HCl [21653-40-7]	AA	0.1 g 1 g 5 g	2,600 9,800 37,000

Substrate for Trypsin-like Proteases and Papain

1) K.A. Walsh, *In*, Proteolytic Enzymes, *Methods in Enzymology*, **Vol. 19**, (G.E. Perlmann and L. Lorand, eds.), Academic Press, New York, 1970, pp. 41-63.
2) R. Arnon, *In*, Proteolytic Enzymes, *Methods in Enzymology*, **Vol. 19**, (G.E. Perlmann and L. Lorand, eds.), Academic Press, New York, 1970, pp. 226-244.
3) G.A. Grant, A.Z. Eisen, and R.A. Bradshaw, *In*, Proteolytic Enzymes Part C, *Methods in Enzymology*, **Vol. 80**, (L. Lorand, ed.), Academic Press, New York, 1981, pp. 722-734.

3126 2～10℃	**Bz-Gly-Ala-Pro** **[Hippuryl-Alanyl-Proline]** Benzoylglycyl-L-alanyl-L-proline (M.W. 347.37) $C_{17}H_{21}N_3O_5$ [73167-84-7]	AA	0.1 g 1 g	4,300 26,200

Substrate for ACE (Angiotensin I Converting Enzyme)

1) H.S. Cheung, F.L. Wang, M.A. Ondetti, E.F. Sabo, and D.W. Cushman, *J. Biol. Chem.*, **255**, 401 (1980).

3059 2～10℃	**Bz-Gly-Arg** **[Hippuryl-Arginine]** Benzoylglycyl-L-arginine (M.W. 335.36) $C_{15}H_{21}N_5O_4$ [744-46-7]	AA	0.1 g 1 g	2,500 10,700
3128 2～10℃	**Bz-Gly-Gly-Gly** **[Hippuryl-Glycyl-Glycine]** Benzoylglycylglycylglycine (M.W. 293.28) $C_{13}H_{15}N_3O_5$ [31384-90-4]	AA	0.1 g 1 g	2,900 14,200

Substrate for ACE (Angiotensin I Converting Enzyme)

1) H.Y.T. Yang, E.G. Erdos, and Y. Levin, *J. Pharmacol. Exp. Ther.*, **177**, 291 (1971).
2) T. Nakajima, G. Oshima, H.S.J. Yeh, R. Igic, and E.G. Erdos, *Biochim. Biophys. Acta*, **315**, 430 (1973).
3) G. Oshima, K. Nagasawa, and J. Kato, *J. Biochem.*, **80**, 477 (1976).

3064 2～10℃	**Bz-Gly-His-Leu** • H_2O **[Hippuryl-Histidyl-Leucine]** Benzoylglycyl-L-histidyl-L-leucine (M.W. 429.47• 18.02) $C_{21}H_{27}N_5O_5$ • H_2O [31373-65-6]	AA	0.1 g 1 g	4,300 26,200

Substrate for ACE (Angiotensin I Converting Enzyme)

1) D.W. Cushman and H.S. Cheung, *Biochem. Pharmacol.*, **20**, 1637 (1971).

3047 2～10℃	**Bz-Gly-Lys** **[Hippuryl-Lysine]** Benzoylglycyl-L-lysine (M.W. 307.34) $C_{15}H_{21}N_3O_4$ [740-63-6]	AA	0.1 g 1 g	2,700 12,500
3010 2～10℃	**Bz-Tyr-OEt** Benzoyl-L-tyrosine ethyl ester (M.W. 313.35) $C_{18}H_{19}NO_4$ [3483-82-7]	AA	0.1 g 1 g 5 g	1,600 2,300 5,400

Substrate for Chymotrypsin

1) P.E. Wilcox, *In*, Proteolytic Enzymes, *Methods in Enzymology*, **Vol. 19**, (G.E. Perlmann and L. Lorand, eds.), Academic Press, New York, 1970, pp. 64-108.

Code	Compound	Grade			Price:Yen
3015 2～10℃	**Bz-Tyr-*p*NA** Benzoyl-L-tyrosine *p*-nitroanilide (M.W. 405.40) $C_{22}H_{19}N_3O_5$ [6154-45-6]	A		0.1 g 1 g	2,700 10,800
	Substrate for Chymotrypsin 1) G.A. Grant, A.Z. Eisen, and R.A. Bradshaw, *In*, Proteolytic Enzymes Part C, *Methods in Enzymology*, **Vol. 80**, (L. Lorand, ed.), Academic Press, New York, 1981, pp. 722-734.				
Carnosine See Code 3085 **β-Alanyl-L-Histidine** on page 192 and 208					
Caspase Inhibitors & Substrates See **List of Inhibitors and Substrates for Various Proteases** on page 162					
3088-v -20℃	**Dnp-Gln-Gly-Ile-Ala-Gly-Gln-D-Arg** 2,4-Dinitrophenyl-L-glutaminylglycyl-L-isoleucyl-L-alanylglycyl-L-glutaminyl-D-arginine (M.W. 894.89) $C_{35}H_{54}N_{14}O_{14}$	B	Vial	2.5 mg	8,800
	Reference Substrate for Collagenase Assay with Code 3087-v 1) Y. Masui, T. Takemoto, S. Sakakibara, H. Hori, and Y. Nagai, *Biochem. Med.*, **17**, 215 (1977).				
3083-v -20℃	**Dnp-Leu-Gly-Ile-Ala-Gly-Arg-NH_2** 2,4-Dinitrophenyl-L-leucylglycyl-L-isoleucyl-L-alanylglycyl-L-arginine amide (M.W. 750.80) $C_{31}H_{50}N_{12}O_{10}$	A	Vial	2.5 mg	7,800
	Substrate for Serum Peptidase 1) Y. Masui, T. Takemoto, S. Sakakibara, H. Hori, and Y. Nagai, *Biochem. Med.*, **17**, 215 (1977).				
3089 2～10℃	**Dnp-Pro-Gln-Gly** 2,4-Dinitrophenyl-L-prolyl-L-glutaminylglycine (M.W. 466.40) $C_{18}H_{22}N_6O_9$ [65080-33-3]	AA		0.1 g 1 g	7,300 42,400
	Reference Compound to Measure Collagenase Activity with Code 3087-v				
3087-v -20℃	**Dnp-Pro-Gln-Gly-Ile-Ala-Gly-Gln-D-Arg** 2,4-Dinitrophenyl-L-prolyl-L-glutaminylglycyl-L-isoleucyl-L-alanylglycyl-L-glutaminyl-D-arginine (M.W. 992.00) $C_{40}H_{61}N_{15}O_{15}$ [63014-08-4]	B	Vial	2.5 mg	9,100
	Substrate for Animal Collagenase 1) Y. Masui, T. Takemoto, S. Sakakibara, H. Hori, and Y. Nagai, *Biochem. Med.*, **17**, 215 (1977).				
3082 2～10℃	**Dnp-Pro-Leu-Gly** 2,4-Dinitrophenyl-L-prolyl-L-leucylglycine (M.W. 451.43) $C_{19}H_{25}N_5O_8$	AA		0.1 g 1 g	5,000 31,500
	Reference Compound to Measure Collagenase Activity with Code 3073-v				
3073-v -20℃	**Dnp-Pro-Leu-Gly-Ile-Ala-Gly-Arg-NH_2** 2,4-Dinitrophenyl-L-prolyl-L-leucylglycyl-L-isoleucyl-L-alanylglycyl-L-arginine amide (M.W. 847.92) $C_{36}H_{57}N_{13}O_{11}$	A	Vial	2.5 mg	8,400
	Substrate for Animal Collagenase 1) Y. Masui, T. Takemoto, S. Sakakibara, H. Hori, and Y. Nagai, *Biochem. Med.*, **17**, 215 (1977).				

Code	Compound	Grade			Price:Yen
3224-s -20℃	**FRETS-VWF73** (Trifluoroacetate Form) Asp-Arg-Glu-A_2pr(Nma)-Ala-Pro-Asn-Leu-Val-Tyr-Met-Val-Thr-Gly-A_2pr(Dnp)-Pro-Ala-Ser-Asp-Glu-Ile-Lys-Arg-Leu-Pro-Gly-Asp-Ile-Gln-Val-Val-Pro-Ile-Gly-Val-Gly-Pro-Asn-Ala-Asn-Val-Gln-Glu-Leu-Glu-Arg-Ile-Gly-Trp-Pro-Asn-Ala-Pro-Ile-Leu-Ile-Gln-Asp-Phe-Glu-Thr-Leu-Pro-Arg-Glu-Ala-Pro-Asp-Leu-Val-Leu-Gln-Arg A_2pr(Nma): N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid A_2pr(Dnp): N^{β}-(2,4-Dinitrophenyl)-2,3-diaminopropionic acid (M.W. 8314.3) $C_{370}H_{583}N_{103}O_{113}S$ Purity: higher than 95% by HPLC *Fluorescence-Quenching Substrate for ADAMTS-13* 1) K. Kokame, M. Matsumoto, Y. Fujimura, and T. Miyata, *Blood*, **103**, 607 (2004). (*VWF73 Sequence*) 2) K. Kokame, Y. Nobe, Y. Kokubo, A. Okayama, and T. Miyata, *Br. J. Haematol.*, **129**, 93 (2005). (*FRETS-VWF73*) 3) E. Groot, J.J.J. Hulstein, C.N. Rison, P.G. De Groot, and R. Fijnheer, *J. Thromb. Haemost.*, **4**, 698 (2006). (*ADAMTS-13 Assay*) • This compound is produced by Peptide Institute, Inc. under the license of National Cardiovascular Center.		Vial	0.1 mg	30,000
3154-v -20℃	**Glt-Ala-Ala-Phe-MCA** Glutaryl-L-alanyl-L-alanyl-L-phenylalanine 4-methylcoumaryl-7-amide (M.W. 578.61) $C_{30}H_{34}N_4O_8$ *Substrate for Chymotrypsin*	A	Vial	5 mg	5,400
3129 2～10℃	**Glt-Ala-Ala-Pro-Leu-*p*NA** Glutaryl-L-alanyl-L-alanyl-L-prolyl-L-leucine *p*-nitroanilide (M.W. 604.65) $C_{28}H_{40}N_6O_9$ *Substrate for Pancreatic Elastase* 1) E.G. Del Mar, C. Largman, J.W. Brodrick, M. Fassett, and M.C. Geokas, *Biochemistry*, **19**, 468 (1980).	AA		0.1 g 1 g	7,800 54,400
3097-v -20℃	**Glt-Gly-Arg-MCA*** Glutarylglycyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 502.52) $C_{23}H_{30}N_6O_7$ [65147-16-2] *Substrate for u-PA (Urokinase)* * 本品は第十五改正日本薬局方「一般試験法」収載試薬です。 1) T. Morita, H. Kato, S. Iwanaga, K. Takada, T. Kimura, and S. Sakakibara, *J. Biochem.*, **82**, 1495 (1977). 2) S. Iwanaga, T. Morita, H. Kato, T. Harada, N. Adachi, T. Sugo, I. Maruyama, K. Takada, T. Kimura, and S. Sakakibara, *In*, KININS-II: Biochemistry, Pathophysiology, and Clinical Aspects, (S. Fujii, H. Moriya, and T. Suzuki eds.), Plenum Publishing Co., 1979, pp.147-163.	A	Vial	5 mg	4,100
3080 2～10℃	**Glu-Glu** L-Glutamyl-L-glutamic acid (M.W. 276.24) $C_{10}H_{16}N_2O_7$ [3929-61-1]	A		0.1 g 1 g	3,400 17,800
3066 2～10℃	**Glu(*p*NA)** • H_2O L-Glutamic acid γ-*p*-nitroanilide (M.W. 267.24 • 18.02) $C_{11}H_{13}N_3O_5$ • H_2O [122864-94-2] *Substrate for γ-Glutamyl Transpeptidase*	A		0.1 g 1 g 5 g	1,700 4,900 18,000
3067 -20℃	**Glu-*p*NA** • H_2O L-Glutamic acid α-*p*-nitroanilide (M.W. 267.24 • 18.02) $C_{11}H_{13}N_3O_5$ • H_2O	A		0.1 g 1 g	2,400 7,800

Code	Compound	Grade			Price:Yen
3050 2～10℃	**Glu(Cys-Gly)** **[Glutathione; GSH]** γ-L-Glutamyl-L-cysteinylglycine (M.W. 307.32) $C_{10}H_{17}N_3O_6S$ [70-18-8]	B		1 g 5 g 25 g	1,800 2,700 6,100
Glutathione See Code 3050 **Glu(Cys-Gly)** above					
3028 2～10℃	**Gly-Gly** Glycylglycine (M.W. 132.12) $C_4H_8N_2O_3$ [556-50-3]	AA		5 g 25 g 100 g	1,800 2,800 7,000
3061 2～10℃	**Gly-Gly-Gly** Glycylglycylglycine (M.W. 189.17) $C_6H_{11}N_3O_4$ [556-33-2]	AA		1 g 5 g 25 g	2,600 7,000 27,500
3076 2～10℃	**Gly-Gly-His** Glycylglycyl-L-histidine (M.W. 269.26) $C_{10}H_{15}N_5O_4$ [93404-95-6] *Cu-Binding Peptide* 1) S. Lau, T.P.A. Kruch, and B. Sarkar, *J. Biol. Chem.*, **249**, 5878 (1974).	A		0.1 g 1 g	4,400 30,000
3119 2～10℃	**Gly-Gly-Tyr-Arg** Glycylglycyl-L-tyrosyl-L-arginine (M.W. 451.48) $C_{19}H_{29}N_7O_6$ [70195-20-9] *Affinity Ligand for Papain* 1) M.O. Funk, Y. Nakagawa, J. Skochdopole, and E.T. Kaiser, *Int. J. Pept. Protein Res.*, **13**, 296 (1979).	A		0.1 g 1 g	5,800 30,000
3022 2～10℃	**Gly-Leu** Glycyl-L-leucine (M.W. 188.22) $C_8H_{16}N_2O_3$ [869-19-2]	AA		0.1 g 1 g 5 g	1,700 3,100 9,000
3053 2～10℃	**Gly-Phe** Glycyl-L-phenylalanine (M.W. 222.24) $C_{11}H_{14}N_2O_3$ [3321-03-7]	AA		0.1 g 1 g	1,800 3,200
3023 2～10℃	**Gly-Phe-NH_2** Glycyl-L-phenylalanine amide (M.W. 221.26) $C_{11}H_{15}N_3O_2$ [13467-26-0]	AA		0.1 g 1 g	2,300 7,100
3052 2～10℃	**Gly-Pro** Glycyl-L-proline (M.W. 172.18) $C_7H_{12}N_2O_3$ [704-15-4]	AA		0.1 g 1 g	1,900 5,000
3090-v -20℃	**Gly-Pro-MCA** (Tosylate Form) Glycyl-L-proline 4-methylcoumaryl-7-amide (M.W. 329.35) $C_{17}H_{19}N_3O_4$ [67341-42-8] *Substrate for X-Prolyl Dipeptidyl-Aminopeptidase* 1) T. Kato, T. Nagatsu, T. Kimura, and S. Sakakibara, *Biochem. Med.*, **19**, 351 (1978).	AA	Vial	5 mg	3,000

Code	Compound	Grade			Price:Yen
3074-v -20℃	**Gly-Pro-*p*NA • Tos** **[GPNT]** Glycyl-L-proline *p*-nitroanilide monotosylate (M.W. 292.29 • 172.20) $C_{13}H_{16}N_4O_4 \cdot C_7H_8O_3S$ [65096-46-0] *Substrate for X-Prolyl Dipeptidyl-Aminopeptidase* 1) T. Nagatsu, M. Hino, H. Fuyamada, T. Hayakawa, S. Sakakibara, Y. Nakagawa, and T. Takemoto, *Anal. Biochem.*, **74**, 466 (1976). 2) K. Fujita, M. Hirano, J. Ochiai, M. Funabashi, I. Nagatsu, T. Nagatsu, and S. Sakakibara, *Clin. Chim. Acta*, **88**, 15 (1978).	AA	Vial	10 mg	2,700
GPNT See Code 3074 **Gly-Pro-*p*NA • Tos** above					
Hippuryl-Alanyl-Proline See Code 3126 **Bz-Gly-Ala-Pro** on page 214					
Hippuryl-Arginine See Code 3059 **Bz-Gly-Arg** on page 214					
Hippuryl-Glycyl-Glycine See Code 3128 **Bz-Gly-Gly-Gly** on page 214					
Hippuryl-Histidyl-Leucine See Code 3064 **Bz-Gly-His-Leu** on page 214					
Hippuryl-Lysine See Code 3047 **Bz-Gly-Lys** on page 214					
3065 2～10℃	**His-Leu** L-Histidyl-L-leucine (M.W. 268.31) $C_{12}H_{20}N_4O_3$ [7763-65-7]	AA		0.1 g 1 g	2,500 8,800
KYS-1 See Code 3225 **MOCAc-Gly-Ser-Pro-Ala-Phe-Leu-Ala-Lys(Dnp)-D-Arg-NH_2** on page 220					
3024 2～10℃	**Leu-Gly** L-Leucylglycine (M.W. 188.22) $C_8H_{16}N_2O_3$ [686-50-0]	AA		0.1 g 1 g	2,000 4,600
3025 2～10℃	**Leu-Gly-Gly** L-Leucylglycylglycine (M.W. 245.28) $C_{10}H_{19}N_3O_4$ [1187-50-4]	AA		0.1 g 1 g	2,400 9,700
3091-v -20℃	**Leu-MCA** (Tosylate Form) L-Leucine 4-methylcoumaryl-7-amide (M.W. 288.34) $C_{16}H_{20}N_2O_3$ *Substrate for Aminopeptidase* 1) K. Saifuku, T. Sekine, T. Namihisa, T. Takahashi, and Y. Kanaoka, *Clin. Chim. Acta*, **84**, 85 (1978).	AA	Vial	5 mg	2,700
3027 2～10℃	**Leu-NH_2 • HCl** L-Leucine amide monohydrochloride (M.W. 130.19 • 36.46) $C_6H_{14}N_2O \cdot HCl$ [10466-61-2] *Substrate for Aminopeptidase*	AA		0.1 g 1 g	1,900 4,300
3014 2～10℃	**Leu-*p*NA** L-Leucine *p*-nitroanilide (M.W. 251.28) $C_{12}H_{17}N_3O_3$ [4178-93-2] *Substrate for Aminopeptidase* 1) G. Peleiderer, *In,* Proteolytic Enzymes, *Methods in Enzymology*, **Vol. 19**, (G.E. Perlmann and L. Lorand, eds.), Academic Press, New York, 1970, pp. 514-521.	AA		0.1 g 1 g 5 g	1,800 4,100 14,300

Code	Compound	Grade			Price:Yen
3124-v -20℃	**Lys-Ala-MCA** (Tartarate Form) L-Lysyl-L-alanine 4-methylcoumaryl-7-amide (M.W. 374.43) $C_{19}H_{26}N_4O_4$ *Substrate for Dipeptidyl-Aminopeptidase II* 1) D. Mantle, M.F. Hardy, B. Lauffart, J.R. McDermott, A.I. Smith, and R.J.T. Pennington, *Biochem. J.*, **211**, 567 (1983).	A	Vial	5 mg	3,600
3132-v -20℃	**Lys-MCA** (Hydrochloride Form) L-Lysine 4-methylcoumaryl-7-amide (M.W. 303.36) $C_{16}H_{21}N_3O_3$ *Substrate for Aminopeptidase*	A	Vial	5 mg	3,600
Lysine Hydroxylase Substrate L-1 See Code 4166 **Ala-Arg-Gly-Ile-Lys-Gly-Ile-Arg-Gly-Phe-Ser-Gly** on page 208					
3197-v -20℃	**4-Methoxyphenylazoformyl-Phe** **[AAFP]** (Potassium Salt) *N*-(4-Methoxyphenylazoformyl)-L-phenylalanine (M.W. 327.33) $C_{17}H_{17}N_3O_4$ [396717-86-5] *Substrate for Carboxypeptidase A* 1) W.L. Mock, Y. Liu, and D.J. Stanford, *Anal. Biochem.*, **239**, 218 (1996).	B	Vial	5 mg	3,000
3149-v -20℃	**Met-MCA** (Tosylate Form) L-Methionine 4-methylcoumaryl-7-amide (M.W. 306.38) $C_{15}H_{18}N_2O_3S$ *Substrate for Aminopeptidase*	A	Vial	5 mg	3,500
3152 2～10℃	**Met-Met** L-Methionyl-L-methionine (M.W. 280.41) $C_{10}H_{20}N_2O_3S_2$ [7349-78-2]	A		0.1 g 1 g	3,200 15,000
3216-v -20℃	**MOCAc-Ala-Pro-Ala-Lys-Phe-Phe-Arg-Leu-Lys(Dnp)-NH_2** (Trifluoroacetate Form) (7-Methoxycoumarin-4-yl)acetyl-L-alanyl-L-prolyl-L-alanyl-L-lysyl-L-phenylalanyl-L-phenylalanyl-L-arginyl-L-leucyl-N^{ε}-(2,4-dinitrophenyl)-L-lysine amide (M.W. 1458.6) $C_{71}H_{95}N_{17}O_{17}$ *Fluorescence-Quenching Substrate for Proteinase A / Pepsin* 1) H. Kondo, Y. Shibano, T. Amachi, N. Cronin, K. Oda, and B.M. Dunn, *J. Biochem.*, **124**, 141 (1998). • This compound is distributed under the license of Suntory Limited.	A	Vial	1 mg	10,000

Code	Compound	Grade			Price:Yen
3167-v -20℃	**MOCAc-Arg-Pro-Lys-Pro-Tyr-Ala-Nva-Trp-Met-Lys(Dnp)-NH_2** **[NFF-2]** (7-Methoxycoumarin-4-yl)acetyl-L-arginyl-L-prolyl-L-lysyl-L-prolyl-L-tyrosyl-L-alanyl-L-norvalyl-L-tryptophyl-L-methionyl-N^{ε}-(2,4-dinitrophenyl)-L-lysine amide (M.W. 1656.9) $C_{79}H_{105}N_{19}O_{19}S$ [158584-08-8] *Fluorescence-Quenching Substrate for Matrix Metalloproteinases* 1) H. Nagase, C.G. Fields, and G.B. Fields, *J. Biol. Chem.*, **269**, 20952 (1994).	B	Vial	1 mg	8,000
3168-v -20℃	**MOCAc-Arg-Pro-Lys-Pro-Val-Glu-Nva-Trp-Arg-Lys(Dnp)-NH_2** **[NFF-3]** (7-Methoxycoumarin-4-yl)acetyl-L-arginyl-L-prolyl-L-lysyl-L-prolyl-L-valyl-L-glutamyl-L-norvalyl-L-tryptophyl-L-arginyl-N^{ε}-(2,4-dinitrophenyl)-L-lysine amide (M.W. 1675.8) $C_{78}H_{110}N_{22}O_{20}$ [158584-09-9] *Fluorescence-Quenching Substrate for Matrix Metalloproteinase-3 (Stromelysin 1)* 1) H. Nagase, C.G. Fields, and G.B. Fields, *J. Biol. Chem.*, **269**, 20952 (1994).	B	Vial	1 mg	8,000
3184-v -20℃	**MOCAc-Asp-Glu-Val-Asp-Ala-Pro-Lys(Dnp)-NH_2** (7-Methoxycoumarin-4-yl)acetyl-L-aspartyl-L-glutamyl-L-valyl-L-aspartyl-L-alanyl-L-prolyl-N^{ε}-(2,4-dinitrophenyl)-L-lysine amide (M.W. 1154.1) $C_{50}H_{63}N_{11}O_{21}$ *Fluorescence-Quenching Substrate for Caspase-3* 1) M. Enari, R.V. Talanian, W.W. Wong, and S. Nagata, *Nature*, **380**, 723 (1996).	A	Vial	1 mg	15,000
3200-v -20℃	**MOCAc-Gly-Lys-Pro-Ile-Leu-Phe-Phe-Arg-Leu-Lys(Dnp)-D-Arg-NH_2** (7-Methoxycoumarin-4-yl)acetylglycyl-L-lysyl-L-prolyl-L-isoleucyl-L-leucyl-L-phenylalanyl-L-phenylalanyl-L-arginyl-L-leucyl-[N^{ε}-(2,4-dinitrophenyl)-L-lysyl]-D-arginine amide (M.W. 1756.0) $C_{85}H_{122}N_{22}O_{19}$ *Fluorescence-Quenching Substrate for Cathepsin D/E* 1) Y. Yasuda, T. Kageyama, A. Akamine, M. Shibata, E. Kominami, Y. Uchiyama, and K. Yamamoto, *J. Biochem.*, **125**, 1137 (1999).	A	Vial	1 mg	16,000
3225-v -20℃	**MOCAc-Gly-Ser-Pro-Ala-Phe-Leu-Ala-Lys(Dnp)-D-Arg-NH_2** **[KYS-1]** (Trifluoroacetate Form) (7-Methoxycoumarin-4-yl)acetylglycyl-L-seryl-L-prolyl-L-alanyl-L-phenylalanyl-L-leucyl-L-alanyl-[N^{ε}-(2,4-dinitrophenyl)-L-lysyl]-D-arginine amide (M.W. 1327.4) $C_{61}H_{82}N_{16}O_{18}$ *Fluorescence-Quenching Substrate for Cathepsin E* 1) Y. Yasuda, K. Kohmura, T. Kadowaki, T. Tsukuba, and K. Yamamoto, *Biol. Chem.*, **386**, 299 (2005). 2) Y. Yasuda, T. Tsukuba, K. Okamoto, T. Kadowaki, and K. Yamamoto, *J. Biochem.*, **138**, 621 (2005). • This compound is produced by Peptide Institute, Inc. under the license of Kyushu TLO Co., Ltd.	A	Vial	1 mg	10,000

Code	Compound	Grade			Price:Yen
3226-v -20℃	**MOCAc-Lys-Pro-Leu-Gly-Leu-A_2pr(Dnp)-Ala-Arg-NH_2** (Trifluoroacetate Form) (7-Methoxycoumarin-4-yl)acetyl-L-lysyl-L-prolyl-L-leucylglycyl-L-leucyl-[N^{β}-(2,4-dinitrophenyl)-L-2,3-diaminopropionyl]-L-alanyl-L-arginine amide (M.W. 1221.3) $C_{55}H_{80}N_{16}O_{16}$ *Fluorescence-Quenching Substrate for Matrix Metalloproteinases and ADAM-17 / Tumor Necrosis Factor Converting Enzyme (TACE)* 1) U. Neumann, H. Kubota, K. Frei, V. Ganu, and D. Leppert, *Anal. Biochem.*, **328**, 166 (2004). 2) A. Trifilieff, C. Walker, T. Keller, G. Kottirsch, and U. Neumann, *Br. J. Pharmacol.*, **135**, 1655 (2002). 3) M.C. Riitano, H. Pfister, P. Engelhardt, U. Neumann, M. Reist, A. Zurbriggen, M. Stoffel, J. Peel, T. Jungi, P. Schawalder, and D.E. Spreng, *Am. J. Vet. Res.*, **63**, 1423 (2002).	A	Vial	1 mg	8,000
3164-s -20℃	**MOCAc-Pro-Leu-Gly** (7-Methoxycoumarin-4-yl)acetyl-L-prolyl-L-leucylglycine (M.W. 501.53) $C_{25}H_{31}N_3O_8$ [140430-56-4] *Reference Compound for MOCAc-type Fluorescence-Quenching Substrate* 1) C.G. Knight, F. Willenbrock, and G. Murphy, *FEBS Lett.*, **296**, 263 (1992).	AA	Vial	0.1 mg	2,000
3163-v -20℃	**MOCAc-Pro-Leu-Gly-Leu-A_2pr(Dnp)-Ala-Arg-NH_2** (7-Methoxycoumarin-4-yl)acetyl-L-prolyl-L-leucylglycyl-L-leucyl-[N^{β}-(2,4-dinitrophenyl)-L-2,3-diaminopropionyl]-L-alanyl-L-arginine amide (M.W. 1093.1) $C_{49}H_{68}N_{14}O_{15}$ [140430-53-1] *Fluorescence-Quenching Substrate for Matrix Metalloproteinases* 1) C.G. Knight, F. Willenbrock, and G. Murphy, *FEBS Lett.*, **296**, 263 (1992).	A	Vial	1 mg	6,000
3212-v -20℃	**MOCAc-Ser-Glu-Val-Asn-Leu-Asp-Ala-Glu-Phe-Arg-Lys(Dnp)-Arg-Arg-NH_2** (Trifluoroacetate Form) (7-Methoxycoumarin-4-yl)acetyl-L-seryl-L-glutamyl-L-valyl-L-asparaginyl-L-leucyl-L-aspartyl-L-alanyl-L-glutamyl-L-phenylalanyl-L-arginyl-[N^{ε}-(2,4-dinitrophenyl)-L-lysyl]-L-arginyl-L-arginine amide (M.W. 2001.1) $C_{86}H_{125}N_{27}O_{29}$ *Fluorescence-Quenching Substrate for β-Secretase* ***β-Cleavage Site*** ↓ Normal-type APP: .....ISEVKM-DAEFRH..... Swedish-type APP: .....ISEVNL-DAEFRH..... Fluorescence-quenching substrate: MOCAc-SEVNL-DAEFRK(Dnp)RR-NH_2 1) H. Koike, H. Seki, Z. Kouchi, M. Ito, T. Kinouchi, S. Tomioka, H. Sorimachi, T.C. Saido, K. Maruyama, K. Suzuki, and S. Ishiura, *J. Biochem.*, **126**, 235 (1999).	B	Vial	1 mg	15,000

Code	Compound	Grade			Price:Yen
3183-v -20℃	**MOCAc-Tyr-Val-Ala-Asp-Ala-Pro-Lys(Dnp)-NH_2** (7-Methoxycoumarin-4-yl)acetyl-L-tyrosyl-L-valyl-L-alanyl-L-aspartyl-L-alanyl-L-prolyl-N^{ε}-(2,4-dinitrophenyl)-L-lysine amide (M.W. 1144.1) $C_{53}H_{65}N_{11}O_{18}$ *Fluorescence-Quenching Substrate for Caspase-1* 1) M. Enari, R.V. Talanian, W.W. Wong, and S. Nagata, *Nature*, **380**, 723 (1996).	A	Vial	1 mg	15,000
NFF-2	See Code 3167 **MOCAc-Arg-Pro-Lys-Pro-Tyr-Ala-Nva-Trp-Met-Lys(Dnp)-NH_2** on page 220				
NFF-3	See Code 3168 **MOCAc-Arg-Pro-Lys-Pro-Val-Glu-Nva-Trp-Arg-Lys(Dnp)-NH_2** on page 220				
3217-v -20℃	**Nma-Gly-Gly-Val-Val-Ile-Ala-Thr-Val-Lys(Dnp)-D-Arg-D-Arg-D-Arg-NH_2** (Trifluoroacetate Form) [2-(Methylamino)benzoyl]glycylglycyl-L-valyl-L-valyl-L-isoleucyl-L-alanyl-L-threonyl-L-valyl-[N^{ε}-(2,4-dinitrophenyl)-L-lysyl]-D-arginyl-D-arginyl-D-arginine amide (M.W. 1609.8) $C_{70}H_{116}N_{26}O_{18}$ *Fluorescence-Quenching Substrate for γ-Secretase* 1) M.R. Farmery, L.O. Tjernberg, S.E. Pursglove, A. Bergman, B. Winblad, and J. Näslund, *J. Biol. Chem.*, **278**, 24277 (2003). (*Original*)	B	Vial	1 mg	15,000
3229-v New -20℃	**Nma-Ile-His-Pro-Phe-His-Leu-Val-Ile-His-Thr-Lys(Dnp)-D-Arg-D-Arg-NH_2** (Trifluoroacetate Form) [2-(Methylamino)benzoyl]-L-isoleucyl-L-histidyl-L-prolyl-L-phenylalanyl-L-histidyl-L-leucyl-L-valyl-L-isoleucyl-L-histidyl-L-threonyl-[N^{ε}-(2,4-dinitrophenyl)-L-lysyl]-D-arginyl-D-arginine amide (M.W. 1952.2) $C_{91}H_{134}N_{30}O_{19}$ *Fluorescence-Quenching Substrate for Human Renin* 1) S. Takahashi, K. Hori, M. Shinbo, K. Hiwatashi, T. Gotoh, and S. Yamada, *Biosci. Biotechnol. Biochem.*, **72**, 3232 (2008).	A	Vial	1 mg	15,000
3148-v -20℃	**Phe-MCA** (Tosylate Form) L-Phenylalanine 4-methylcoumaryl-7-amide (M.W. 322.36) $C_{19}H_{18}N_2O_3$ [98516-72-4] *Substrate for Aminopeptidase*	AA	Vial	5 mg	2,700

Code	Compound	Grade			Price:Yen
3096-v -20℃	**Pro-Phe-Arg-MCA** (Hydrochloride Form) L-Prolyl-L-phenylalanyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 575.66) $C_{30}H_{37}N_7O_5$ [115918-56-4] *Substrate for Pancreatic / Urinary Kallikrein and Proteasome* 1) T. Morita, H. Kato, S. Iwanaga, K. Takada, T. Kimura, and S. Sakakibara, *J. Biochem.*, **82**, 1495 (1977). 2) V. Ustrell, G. Pratt, and M. Rechesteiner, *Proc. Natl. Acad. Sci. U.S.A.*, **92**, 584 (1995).	A	Vial	5 mg	5,400
3079 2～10℃	**Pyr-Ala** L-Pyroglutamyl-L-alanine (M.W. 200.19) $C_8H_{12}N_2O_4$ [21282-08-6] *Substrate for Pyroglutamyl Peptidase* 1) R.F. Doolittle, *In*, Proteolytic Enzymes, *Methods in Enzymology*, **Vol. 19**, (G.E. Perlmann and L. Lorand, eds.), Academic Press, New York, 1970, pp. 555-569.	AA		0.1 g 1 g	2,700 11,400
3159-v -20℃	**Pyr-Arg-Thr-Lys-Arg-MCA** L-Pyroglutamyl-L-arginyl-L-threonyl-L-lysyl- L-arginine 4-methylcoumaryl-7-amide (M.W. 827.93) $C_{37}H_{57}N_{13}O_9$ [155575-02-3] *Substrate for Furin* 1) K. Hatsuzawa, M. Nagahama, S. Takahashi, K. Takada, K. Murakami, and K. Nakayama, *J. Biol. Chem.*, **267**, 16094 (1992).	A	Vial	5 mg	6,500
3145-v -20℃	**Pyr-Gly-Arg-MCA** L-Pyroglutamylglycyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 499.52) $C_{23}H_{29}N_7O_6$ *Substrate for t-PA and u-PA (Urokinase)*	A	Vial	5 mg	5,400
4237-v -20℃	**Pyr-Lys-Arg-Pro-Ser-Gln-Arg-Ser-Lys-Tyr-Leu** (M.W. 1373.6) $C_{60}H_{100}N_{20}O_{17}$ [136132-68-8] *Substrate for Protein Kinase C* 1) I. Yasuda, A. Kishimoto, S. Tanaka, M. Tominaga, A. Sakurai, and Y. Nishizuka, *Biochem. Biophys. Res. Commun.*, **166**, 1220 (1990).	A	Vial	5 mg	25,000
3101-v -20℃	**Pyr-MCA** L-Pyroglutamic acid 4-methylcoumaryl-7-amide (M.W. 286.28) $C_{15}H_{14}N_2O_4$ [66642-36-2] *Substrate for Pyroglutamyl Peptidase* 1) K. Fujiwara and D. Tsuru, *J. Biochem.*, **83**, 1145 (1978).	AA	Vial	5 mg	3,500

Code	Compound	Grade			Price:Yen
3130 2～10℃	**Pyr-Phe-Leu-*p*NA** L-Pyroglutamyl-L-phenylalanyl-L-leucine *p*-nitroanilide (M.W. 509.55) $C_{26}H_{31}N_5O_6$ [85901-57-1]	AA		0.1 g 1 g	4,800 29,700

Substrate for Thiol Proteases

1) I.Y. Filippova, E.N. Lysogorskaya, E.S. Oksenoit, G.N. Rudenskaya, and V.M. Stepanov, *Anal. Biochem.*, **143**, 293 (1984).

3228-v New -20℃	**Pyr-Pro-Val-*p*NA** L-Pyroglutamyl-L-prolyl-L-valine *p*-nitroanilide (M.W. 445.47) $C_{21}H_{27}N_5O_6$ [83329-36-6]	AA	Vial	5 mg	6,000

Selective Substrate for Human Granulocyte Elastase

1) J.A. Kramps, Ch. van Twisk and A.C. van der Linden, *Scand. J. Clin. Lab. Investig.*, **43**, 427 (1983).
2) L. Persson, J. Bergström, H. Ito, and A. Gustafsson, *J. Periodontol.*, **72**, 90 (2001).
3) I. Groth and S. Alban, *Planta Med.*, **74**, 852 (2008).

Renin Substrate See Code 3110 **Suc-Arg-Pro-Phe-His-Leu-Leu-Val-Tyr-MCA** on page 225
See Code 4133 **Asp-Arg-Val-Tyr-Ile-His-Pro-Phe-His-Leu-Val-Ile-His** on page 209

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

4236-v -20℃	**Ser-Gln-Asn-Tyr-Pro-Ile-Val** (M.W. 819.90) $C_{37}H_{57}N_9O_{12}$	AA	Vial	5 mg	15,000

Substrate for HIV-1 Protease

1) S. Billich, M.-T. Knoop, J. Hansen, P. Strop, J. Sedlacek, R. Mertz, and K. Moeliling, *J. Biol. Chem.*, **263**, 17905 (1988).
2) P.L. Darke, R.F. Nutt, S.F. Brady, V.M. Garsky, T.M. Ciccarone, C.-T. Leu, P.K. Lumma, R.M. Freidinger, D.F. Veber, and I.S. Sigal, *Biochem. Biophys. Res. Commun.*, **156**, 297 (1988).
3) P.L. Darke, C-T. Leu, L.J. Davis, J.C. Heimbach, R.E. Diehl, W.S. Hill, R.A.F. Dixon, and I.S. Sigal, *J. Biol. Chem.*, **264**, 2307 (1989).

STANA See Code 3071 **Suc-Ala-Ala-Ala-*p*NA** on page 225

3153-v -20℃	**Suc(OMe)-Ala-Ala-Pro-Val-MCA** *N*-Methoxysuccinyl-L-alanyl-L-alanyl-L-prolyl-L-valine 4-methylcoumaryl-7-amide (M.W. 627.69) $C_{31}H_{41}N_5O_9$ [72252-90-5]	AA	Vial	5 mg	6,000

Substrate for Human Leukocyte / Porcine Pancreatic Elastase

1) M.J. Castrillo, K. Nakajima, M. Zimmerman, and J.C. Powers, *Anal. Biochem.*, **99**, 53 (1979).

3133-v -20℃	**Suc-Ala-Ala-Ala-MCA** Succinyl-L-alanyl-L-alanyl-L-alanine 4-methylcoumaryl-7-amide (M.W. 488.49) $C_{23}H_{28}N_4O_8$ [73617-90-0]	AA	Vial	5 mg	6,000

Substrate for Elastase

1) R.A. Mumford, A.W. Strauss, J.C. Powers, P.A. Pierzchala, N. Nishino, and M. Zimmerman, *J. Biol. Chem.*, **255**, 2227 (1980).

Code	Compound	Grade			Price:Yen
3071-v -20℃	**Suc-Ala-Ala-Ala-*p*NA** **[STANA]** Succinyl-L-alanyl-L-alanyl-L-alanine *p*-nitroanilide (M.W. 451.43) $C_{19}H_{25}N_5O_8$ [52299-14-6]	AA	Vial	5 mg	1,900
3071 2～10℃	**Suc-Ala-Ala-Ala-*p*NA** **[STANA]** Succinyl-L-alanyl-L-alanyl-L-alanine *p*-nitroanilide (M.W. 451.43) $C_{19}H_{25}N_5O_8$ [52299-14-6] *Substrate for Elastase* 1) J. Bieth, B. Spiess, and C.G. Wermuth, *Biochem. Med.*, **11**, 350 (1974).	AA		0.1 g 1 g	4,400 26,000
3117 2～10℃	**Suc-Ala-Ala-*p*NA** Succinyl-L-alanyl-L-alanine *p*-nitroanilide (M.W. 380.35) $C_{16}H_{20}N_4O_7$	AA		0.1 g 1 g	3,200 15,800
3114-v -20℃	**Suc-Ala-Ala-Pro-Phe-MCA** Succinyl-L-alanyl-L-alanyl-L-prolyl-L-phenylalanine 4-methylcoumaryl-7-amide (M.W. 661.70) $C_{34}H_{39}N_5O_9$ [88467-45-2] *Substrate for Chymotrypsin* 1) H. Sawada, H. Yokosawa, M. Hoshi, and S. Ishii, *Experientia*, **39**, 377 (1983).	A	Vial	5 mg	6,000
3160-v -20℃	**Suc-Ala-Glu-MCA** Succinyl-L-alanyl-L-glutamic acid α-(4-methylcoumaryl-7-amide) (M.W. 475.45) $C_{22}H_{25}N_3O_9$ *Substrate for Ingensin / Proteasome* 1) S. Ishiura, T. Tsukahara, T. Tabira, and H. Sugita, *FEBS Lett.*, **257**, 388 (1989).	A	Vial	5 mg	4,300
3162-v -20℃	**Suc-Ala-Leu-Pro-Phe-*p*NA** Succinyl-L-alanyl-L-leucyl-L-prolyl- L-phenylalanine *p*-nitroanilide (M.W. 666.72) $C_{33}H_{42}N_6O_9$ *Substrate for PPIase (Peptidyl Prolyl cis-trans Isomerase)* 1) J.L. Kofron, P. Kuzmic, V. Kishore, E. Colon-Bonilla, and D.H. Rich, *Biochemistry*, **30**, 6127 (1991).	A	Vial	10 mg	10,000
3116 2～10℃	**Suc-Ala-*p*NA** Succinyl-L-alanine *p*-nitroanilide (M.W. 309.27) $C_{13}H_{15}N_3O_6$	AA		0.1 g 1 g	2,500 8,800
3100-v -20℃	**Suc-Ala-Pro-Ala-MCA** Succinyl-L-alanyl-L-prolyl-L-alanine 4-methylcoumaryl-7-amide (M.W. 514.53) $C_{25}H_{30}N_4O_8$ [88467-44-1] *Substrate for Elastase* 1) G. Oshima, K. Akashi, and M. Yamada, *Arch. Biochem. Biophys.*, **233**, 212 (1984).	A	Vial	5 mg	6,000

Code	Compound	Grade			Price:Yen
3118 2～10℃	**Suc-Ala-Pro-Ala-*p*NA** Succinyl-L-alanyl-L-prolyl-L-alanine *p*-nitroanilide (M.W. 477.47) $C_{21}H_{27}N_5O_8$ *Substrate for Elastase*	AA		0.1 g 1 g	4,800 29,700
3110-v -20℃	**Suc-Arg-Pro-Phe-His-Leu-Leu-Val-Tyr-MCA** Succinyl-L-arginyl-L-prolyl-L-phenylalanyl-L-histidyl-L-leucyl-L-leucyl-L-valyl-L-tyrosine 4-methylcoumaryl-7-amide (M.W. 1301.5) $C_{66}H_{88}N_{14}O_{14}$ [76524-84-0] *Substrate for Renin and Proteinase A* 1) K. Murakami, T. Ohsawa, S. Hirose, K. Takada, and S. Sakakibara, *Anal. Biochem.*, **110**, 232 (1981). 2) H. Yokosawa, H. Ito, S. Murata, and S. Ishii, *Anal. Biochem.*, **134**, 210 (1983).	A	Vial	1 mg	5,400
3222-v -20℃	**Suc-D-Asp-MCA** Succinyl-D-aspartic acid α-(4-methylcoumaryl-7-amide) (M.W. 390.34) $C_{18}H_{18}N_2O_8$ *Selective Substrate for D-Aspartyl Endopeptidase* 1) T. Kinouchi, S. Ishiura, Y. Mabuchi, Y. Urakami-Manaka, H. Nishio, Y. Nishiuchi, M. Tsunemi, K. Takada, M. Watanabe, M. Ikeda, H. Matsui, S. Tomioka, H. Kawahara, T. Hamamoto, K. Suzuki, and Y. Kagawa, *Biochem. Biophys. Res. Commun.*, **314**, 730 (2004).	AA	Vial	5 mg	6,000
3108-v -20℃	**Suc-Gly-Pro-Leu-Gly-Pro-MCA** Succinylglycyl-L-prolyl-L-leucylglycyl-L-proline 4-methylcoumaryl-7-amide (M.W. 696.75) $C_{34}H_{44}N_6O_{10}$ [72698-36-3] *Substrate for Collagenase-like Peptidase* 1) K. Kojima, H. Kinoshita, T. Kato, T. Nagatsu, K. Takada, and S. Sakakibara, *Anal. Biochem.*, **100**, 43 (1979).	A	Vial	5 mg	6,000
3109-v -20℃	**Suc-Gly-Pro-MCA** Succinylglycyl-L-proline 4-methylcoumaryl-7-amide (M.W. 429.42) $C_{21}H_{23}N_3O_7$ [80049-85-0] *Substrate for Propyl Endopeptidase (Post-Proline Cleaving Enzyme)* 1) T. Kato, T. Nakano, K. Kojima, T. Nagatsu, and S. Sakakibara, *J. Neurochem.*, **35**, 527 (1980).	AA	Vial	5 mg	4,100
3158-v -20℃	**Suc-Ile-Ala-MCA** Succinyl-L-isoleucyl-L-alanine 4-methylcoumaryl-7-amide (M.W. 459.49) $C_{23}H_{29}N_3O_7$ [126103-95-5] *Substrate for Amyloid A4-Generating Enzyme* 1) S. Ishiura, T. Tsukahara, T. Tabira, T. Shimizu, K. Arahata, and H. Sugita, *FEBS Lett.*, **260**, 131 (1990). 2) S. Ishiura, T. Nishikawa, T. Tsukahara, T. Momoi, H. Itoh, K. Suzuki, and H. Sugita, *Neurosci. Lett.*, **115**, 329 (1990).	A	Vial	5 mg	4,300
3150-v -20℃	**Suc-Ile-Ile-Trp-MCA** Succinyl-L-isoleucyl-L-isoleucyl-L-tryptophan 4-methylcoumaryl-7-amide (M.W. 687.78) $C_{37}H_{45}N_5O_8$ [133525-12-9]	A	Vial	5 mg	6,000

Code	Compound	Grade			Price:Yen
3120-v -20℃	**Suc-Leu-Leu-Val-Tyr-MCA** Succinyl-L-leucyl-L-leucyl-L-valyl-L-tyrosine 4-methylcoumaryl-7-amide (M.W. 763.88) $C_{40}H_{53}N_5O_{10}$ [94367-21-2]	A	Vial	5 mg	6,000

Substrate for Chymotrypsin, Ingensin / Proteasome and Calpain

1) H. Sawada, H. Yokosawa, M. Hoshi, and S. Ishii, *Experientia*, **39**, 377 (1983).
2) T. Sasaki, T. Kikuchi, N. Yumoto, N. Yoshimura, and T. Murachi, *J. Biol. Chem.*, **259**, 12489 (1984).
3) S. Ishiura, M. Sano, K. Kamakura, and H. Sugita, *FEBS Lett.*, **189**, 119 (1985).
4) T. Tsukahara, S. Ishiura, and H. Sugita, *Eur. J. Biochem.*, **177**, 261 (1988).

TAME See Code 3003 **Tos-Arg-OMe • HCl** below

TMRIA-K4 See Code 3401 on page 240

Code	Compound	Grade			Price:Yen
3003 2～10℃	**Tos-Arg-OMe • HCl** **[TAME]** Tosyl-L-arginine methyl ester monohydrochloride (M.W. 342.41 • 36.46) $C_{14}H_{22}N_4O_4S$ • HCl [1784-03-8]	A		5 g 25 g 100 g	3,000 8,400 27,200

Substrate for Trypsin

1) K.A. Walsh, *In*, Proteolytic Enzymes, *Methods in Enzymology*, **Vol. 19**, (G.E. Perlmann and L. Lorand, eds.), Academic Press, New York, 1970, pp. 41-63.

Code	Compound	Grade			Price:Yen
3054 2～10℃	**Tos-Lys-OMe • HCl** Tosyl-L-lysine methyl ester monohydrochloride (M.W. 314.40 • 36.46) $C_{14}H_{22}N_2O_4S$ • HCl [5266-48-8]	A		0.1 g 1 g	1,900 3,600

Substrate for Trypsin

1) F. Widmer and J.T. Johansen, *Carlsberg Res. Commun.*, **44**, 37 (1979).
2) F. Widmer, K. Breddam, and J.T. Johansen, *In, Peptides 1980*, Proceedings of 16th. European Peptide Symposium (K. Brunfeldt, ed.), Scriptor, Copenhagen, 1981, pp. 46-55.

Code	Compound	Grade			Price:Yen
3209-v -20℃	**Z-Ala-Ala-Asn-MCA** Benzyloxycarbonyl-L-alanyl-L-alanyl-L-asparagine 4-methylcoumaryl-7-amide (M.W. 565.57) $C_{28}H_{31}N_5O_8$ [149697-16-5]	A	Vial	5 mg	5,000

Substrate for Legumain

Legumain is an asparaginyl endopeptidase first identified in seeds of leguminous plants[1] and subsequently in mammalian lysosome[2]. Recently, two interesting reports on this widespread enzyme "legumain" have been published under the following titles: i) "An asparaginyl endopeptidase processes a microbial antigen for class II MHC presentation"[3] and ii) "Identification of human asparaginyl endopeptidase (legumain) as an inhibitor of osteoclast formation and bone resorption"[4]. Characterization of porcine kidney enzyme is given in ref.[5]

1) A.A. Kembhavi, D.J. Buttle, C.G. Knight, and A.J. Barrett, *Arch. Biochem. Biophys.*, **303**, 208 (1993).
2) J.-M. Chen, P.M. Dando, N.D. Rawlings, M.A. Brown, N.E. Young, R.A. Stevens, E. Hewitt, C. Watts, and A.J. Barrett, *J. Biol. Chem.*, **272**, 8090 (1997).
3) B. Manoury, E.W. Hewitt, N. Morrice, P.M. Dando, A.J. Barrett, and C. Watts, *Nature*, **396**, 695 (1998).
4) S.J. Choi, S.V. Reddy, R.W. Devlin, C. Menaa, H. Chung, B.F. Boyce, and G.D. Roodman, *J. Biol. Chem.*, **274**, 27747 (1999).
5) P.M. Dando, M. Fortunato, L. Smith, C.G. Knight, J.E. McKendrick, and A.J. Barrett, *Biochem. J.*, **339**, 743 (1999).

Code	Compound	Grade			Price:Yen
3127	**Z-Ala-Ala-Leu-*p*NA**	AA		0.1 g	4,400
2～10℃	Benzyloxycarbonyl-L-alanyl-L-alanyl-L-leucine *p*-nitroanilide			1 g	26,700
	(M.W. 527.57) $C_{26}H_{33}N_5O_7$ [61043-33-2]				
	Substrate for Subtilisin A and Serine Protease of Bacillus subtilis IFO3027 / Neprilysin				
	1) V.M. Stepanov, A.Y. Strongin, L.S. Izotova, Z.T. Abramov, L.A. Lyublinskaya, L.M. Ermakova, L.A. Baratova, and L.P. Belyanova, *Biochem. Biophys. Res. Commun.*, **77**, 298 (1977).				
	2) Y. Shimizu, T. Nishino, and S. Murao, *Agric. Biol. Chem.*, **47**, 1775 (1983).				
	3) Y. Takaki, N. Iwata, S. Tsubuki, S. Taniguchi, S. Toyoshima, B. Lu, N.P. Gerard, C. Gerard, H.-J. Lee, K. Shirotani, and T.C. Saido, J. Biochem., 128, 897 (2000).				
	4) N. Iwata, Y. Takaki, S. Fukami, S. Tsubuki, and T.C. Saido, *J. Neurosci. Res.*, **70**, 493 (2002).				
3123-v	**Z-Arg-Arg-MCA**	A	Vial	5 mg	4,100
-20℃	(Hydrochloride Form) Benzyloxycarbonyl-L-arginyl-L-arginine 4-methylcoumaryl-7-amide				
	(M.W. 621.69) $C_{30}H_{39}N_9O_6$ [88937-61-5]				
	Substrate for Cathepsin B				
	1) A.J. Barrett and H. Kirschke, *In*, Proteolytic Enzymes Part C, *Methods in Enzymology*, **Vol. 80**, (L. Lorand, ed.), Academic Press, New York, 1981, pp. 535–561.				
3157	**Z-Arg-OBzl(*p*-NO_2) • HBr**	A		0.1 g	3,000
2～10℃	Benzyloxycarbonyl-L-arginine *p*-nitrobenzyl ester monohydrobromide			1 g	19,000
	(M.W. 443.45 • 80.91) $C_{21}H_{25}N_5O_6$ • HBr [96723-72-7]				
Z-Asp-CH_2-DCB See Code 3174 on page 199					
3190	**Z-Gln-Gly**	AA		1 g	15,000
2～10℃	Benzyloxycarbonyl-L-glutaminylglycine			5 g	45,000
	(M.W. 337.33) $C_{15}H_{19}N_3O_6$ [6610-42-0]				
	Substrate for Transglutaminase				
	1) J.E. Folk and P.W. Cole, *J. Biol. Chem.*, **241**, 5518 (1966).				
	2) H. Ando, M. Adachi, K. Umeda, A. Matsuura, M. Nonaka, R. Uchio, H. Tanaka, and M. Motoki, *Agric. Biol. Chem.*, **53**, 2613 (1989).				
Z-Glu-Lys(bio)-Asp-aomk See Code 3189 **Z-Glu-Lys(Biotinyl)-Asp-CH_2-DMB** on page 199					

Code	Compound	Grade			Price:Yen
3018 2～10℃	**Z-Glu-Tyr** Benzyloxycarbonyl-L-glutamyl-L-tyrosine (M.W. 444.43) $C_{22}H_{24}N_2O_8$ [988-75-0]	AA		0.1 g 1 g	2,100 6,400
3111 2～10℃	**Z-Gly-Gly-Leu-*p*NA** Benzyloxycarbonylglycylglycyl-L-leucine *p*-nitroanilide (M.W. 499.52) $C_{24}H_{29}N_5O_7$ [53046-98-3] *Substrate for Neutral Endopeptidase* 1) M. Orlowski and S. Wilk, *In,* Peptides, Structure and Biological Function, (E. Gross and J. Meienhofer, eds.), Pierce Chemical Co., 1980, pp. 925-928.	AA		25 mg 100 mg 1 g	5,200 14,000 91,000
3019 2～10℃	**Z-Gly-Leu** Benzyloxycarbonylglycyl-L-leucine (M.W. 322.36) $C_{16}H_{22}N_2O_5$ [1421-69-8]	AA		0.1 g 1 g	2,000 5,300
3037 2～10℃	**Z-Gly-Leu-NH_2** Benzyloxycarbonylglycyl-L-leucine amide (M.W. 321.37) $C_{16}H_{23}N_3O_4$ [7535-72-0]	AA		0.1 g 1 g	2,300 7,100
3020 2～10℃	**Z-Gly-Phe** Benzyloxycarbonylglycyl-L-phenylalanine (M.W. 356.37) $C_{19}H_{20}N_2O_5$ [1170-76-9]	AA		0.1 g 1 g 5 g	1,800 4,600 20,000
3021 2～10℃	**Z-Gly-Phe-NH_2** Benzyloxycarbonylglycyl-L-phenylalanine amide (M.W. 355.39) $C_{19}H_{21}N_3O_4$ [5513-69-9]	AA		0.1 g 1 g	2,300 7,100
3055 2～10℃	**Z-Gly-Pro** Benzyloxycarbonylglycyl-L-proline (M.W. 306.31) $C_{15}H_{18}N_2O_5$ [1160-54-9]	AA		0.1 g 1 g	1,800 4,600
3208-v -20℃	**Z-Gly-Pro-Arg-MCA** (Hydrochloride Form) Benzyloxycarbonylglycyl-L-prolyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 619.67) $C_{31}H_{37}N_7O_7$ [201928-42-9] *Substrate for Cathepsin K* 1) K. Aibe, H. Yazawa, K. Abe, K. Teramura, M. Kumegawa, H. Kawashima, and K. Honda, *Biol. Pharm. Bull.*, **19**, 1026 (1996). 2) F. Bühling, A. Gerber, C. Häckel, S. Krüger, T. Köhnlein, D. Brömme, D. Reinhold, S. Ansorge, and T. Welte, *Am. J. Respir. Cell Mol. Biol.*, **20**, 612 (1999).	AA	Vial	5 mg	5,000
3039 2～10℃	**Z-Gly-Pro-Leu** Benzyloxycarbonylglycyl-L-prolyl-L-leucine (M.W. 419.47) $C_{21}H_{29}N_3O_6$ [2646-63-1]	AA		0.1 g 1 g	3,200 15,800
3040 2～10℃	**Z-Gly-Pro-Leu-Gly** Benzyloxycarbonylglycyl-L-prolyl-L-leucylglycine (M.W. 476.52) $C_{23}H_{32}N_4O_7$	AA		0.1 g 1 g	4,800 29,700

Code	Compound	Grade			Price:Yen
3029 2～10℃	**Z-Gly-Pro-Leu-Gly-Pro** Benzyloxycarbonylglycyl-L-prolyl-L-leucylglycyl-L-proline (M.W. 573.64) $C_{28}H_{39}N_5O_8$ [2646-61-9] *Crystalline: Substrate for Bacterial Collagenase* 1) Y. Nagai, S. Sakakibara, H. Noda, and S. Akabori, *Biochim. Biophys. Acta*, **37**, 567 (1960).	AA		0.1 g 1 g	7,800 54,400
3215-v -20℃	**Z-His-Glu-Lys-MCA** (Hydrochloride Form) Benzyloxycarbonyl-L-histidyl-L-glutamyl-L-lysine 4-methylcoumaryl-7-amide (M.W. 703.74) $C_{35}H_{41}N_7O_9$ *Substrate for Lys-Gingipain* 1) N. Abe, A. Baba, T. Kadowaki, K. Okamoto, S. Okazaki, T. Asao, and K. Yamamoto, *J. Biochem.*, **128**, 877 (2000).	AA	Vial	5 mg	5,700
Z-Ile-Glu(OBu^t)-Ala-Leu-H (aldehyde) See Code 3169 on page 200					
3176-v -20℃	**Z-Leu-Arg-Gly-Gly-MCA** Benzyloxycarbonyl-L-leucyl-L-arginylglycylglycine 4-methylcoumaryl-7-amide (M.W. 692.76) $C_{34}H_{44}N_8O_8$ [167698-68-2] *Substrate for Isopeptidase T* 1) R.L. Stein, Z. Chen, and F. Melandri, *Biochemistry*, **34**, 12616 (1995).	A	Vial	5 mg	7,000
3210-v -20℃	**Z-Leu-Arg-MCA** (Hydrochloride Form) Benzyloxycarbonyl-L-leucyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 578.66) $C_{30}H_{38}N_6O_6$ *Substrate for Cathepsin K/S/V* 1) D. Brömme, K. Okamoto, B.B. Wang, and S. Biroc, *J. Biol. Chem.*, **271**, 2126 (1996). 2) D. Brömme, Z. Li, M. Barnes, and E. Mehler, *Biochemistry*, **38**, 2377 (1999).	AA	Vial	5 mg	5,000
Z-Leu-Leu-H (aldehyde) See Code 3178 on page 200					
3179-v -20℃	**Z-Leu-Leu-Glu-MCA** Benzyloxycarbonyl-L-leucyl-L-leucyl-L-glutamic acid α-(4-methylcoumaryl-7-amide) (M.W. 664.75) $C_{35}H_{44}N_4O_9$ [348086-66-8] *Substrate for Proteasome*	A	Vial	5 mg	6,000
Z-Leu-Leu-Leu-H (aldehyde) See Code 3175 on page 200					
3177-v -20℃	**Z-Leu-Leu-Leu-MCA** Benzyloxycarbonyl-L-leucyl-L-leucyl-L-leucine 4-methylcoumaryl-7-amide (M.W. 648.79) $C_{36}H_{48}N_4O_7$ *Substrate for Proteasome* 1) S. Tsubuki, H. Kawasaki, Y. Saito, N. Miyashita, M. Inomata, and S. Kawashima, *Biochem. Biophys. Res. Commun.*, **196**, 1195 (1993).	A	Vial	5 mg	5,000
Z-Leu-Leu-Nva-H (aldehyde) See Code 3170 on page 201					

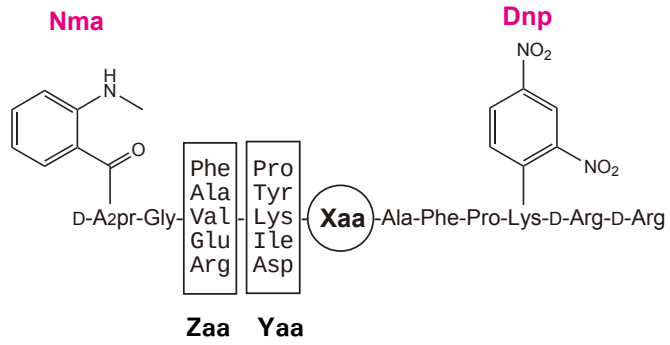
Code	Compound	Grade			Price:Yen
3095-v -20℃	**Z-Phe-Arg-MCA** (Hydrochloride Form) Benzyloxycarbonyl-L-phenylalanyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 612.68) $C_{33}H_{36}N_6O_6$ [65147-22-0] *Substrate for Plasma Kallikrein, Cathepsin B/L and Arg-Gingipain* 1) T. Morita, H. Kato, S. Iwanaga, K. Takada, T. Kimura, and S. Sakakibara, *J. Biochem.*, **82**, 1495 (1977). 2) A.J. Barret, *Biochem. J.*, **187**, 909 (1980).	AA	Vial	5 mg	3,500
3044 2～10℃	**Z-Phe-Tyr** Benzyloxycarbonyl-L-phenylalanyl-L-tyrosine (M.W. 462.49) $C_{26}H_{26}N_2O_6$	AA		0.1 g 1 g	2,300 7,100
3131 2～10℃	**Z-Phe-Tyr-Leu** Benzyloxycarbonyl-L-phenylalanyl-L-tyrosyl-L-leucine (M.W. 575.65) $C_{32}H_{37}N_3O_7$ *Substrate for Metalloproteinase*	AA		0.1 g 1 g	7,800 54,400
3138-v -20℃	**Z-Pyr-Gly-Arg-MCA** (Hydrochloride Form) Benzyloxycarbonyl-L-pyroglutamylglycyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 633.65) $C_{31}H_{35}N_7O_8$ *Substrate for Factor Xa* 1) S. Kawabata, T. Miura, T. Morita, H. Kato, K. Fujikawa, S. Iwanaga, K. Takada, T. Kimura, and S. Sakakibara, *Eur. J. Biochem.*, **172**, 17 (1988).	A	Vial	5 mg	5,400
3069 2～10℃	**Z-Tyr-Glu** Benzyloxycarbonyl-L-tyrosyl-L-glutamic acid (M.W. 444.43) $C_{22}H_{24}N_2O_8$ [988-70-5]	AA		0.1 g 1 g	2,600 9,800
3016 -20℃	**Z-Tyr-ONp** Benzyloxycarbonyl-L-tyrosine *p*-nitrophenyl ester (M.W. 436.41) $C_{23}H_{20}N_2O_7$ [3556-56-7]	A-B		0.1 g 1 g	1,900 5,000
3156-v -20℃	**Z-Val-Lys-Met-MCA** (Hydrochloride Form) Benzyloxycarbonyl-L-valyl-L-lysyl-L-methionine 4-methylcoumaryl-7-amide (M.W. 667.82) $C_{34}H_{45}N_5O_7S$ [141223-71-4] *Substrate for Amyloid A4-Generating Enzyme and Proteasome* 1) S. Ishiura, T. Nishikawa, T. Tsukahara, T. Momoi, H. Ito, K. Suzuki, and H. Sugita, *Neurosci. Lett.*, **115**, 329 (1990).	A	Vial	5 mg	5,700
3211-v -20℃	**Z-Val-Val-Arg-MCA** (Hydrochloride Form) Benzyloxycarbonyl-L-valyl-L-valyl-L-arginine 4-methylcoumaryl-7-amide (M.W. 663.76) $C_{34}H_{45}N_7O_7$ *Substrate for Cathepsin S/L* 1) D. Brömme, A. Steinert, S. Friebe, S. Fittkau, B. Wiederanders, and H. Kirschke, *Biochem. J.*, **264**, 475 (1989). 2) H. Kirschke and B. Wiederanders, *In*, Proteolytic Enzymes: Serine and Cysteine Peptidases, *Methods in Enzymology*, **Vol. 244**, (A.J. Barrett ed.), Academic Press, New York, 1994, pp. 500-511.	AA	Vial	5 mg	6,000

FRETS (Peptide) Library

FRETS*-25Xaa Series

* FRETS : Fluorescence Resonance Energy Transfer Substrates

Design of FRETS-25Xaa



Each substrate (Code 3701-v - Code 3719-v) in the FRETS-25Xaa series contains a highly fluorescent 2-(N-methylamino)benzoyl (Nma) group linked to the side chain of the amino-terminal D-2,3-diamino propionic acid (D-A_2pr) residue, which is efficiently quenched by a 2,4-dinitrophenyl (Dnp) group linked to the ε-amino function of Lys. Xaa represents a fixed position of each of the 19 natural amino acids excluding Cys (*noted in product name Code 3701-v - Code 3719-v*). A mixture of 5 amino acid residues (P, Y, K, I, and D) is at the Yaa position along with a mixture of 5 amino acid residues (F, A, V, E, and R) at the Zaa position for each fixed Xaa. This provides a peptide mixture of 25 combinations of each Xaa series resulting in a combinatorial library totaling 475 peptide substrates. Both Nma and Dnp groups are linked to the side chain of the individual residues, allowing for the determination of the cleavage site by a specific enzyme through mass spectrometric analysis and Edman degradation as well.

Principle

When an enzyme of interest cleaves any peptide bond between D-A_2pr(Nma) and Lys(Dnp) in the substrate, the fluorescence at λex = 340 nm and λem = 440 nm increases in proportion to the release of the Nma fluorophore from the internal Dnp quencher.

Reagents

1) Each substrate stock solutions: each FRETS-25Xaa (Code 3701-v - Code 3719-v) in 1.0 ml of DMSO (1 mM, total of peptides)
2) Reference compounds stock solution: a 1:1 mixture of two solutions of Code 3720-v and Code 3721-v, each of which is reconstituted by dissolving peptides in 0.5 ml of DMSO at the concentration of 2 mM (1 mM, each reference compound)
3) Enzyme solution: an enzyme of interest in an appropriate buffer
4) Buffer

Procedure for the deduction of the substrate specificity of an enzyme with unidentified cleavage specificity

Choose the proper conditions for the measurement, such as substrate concentration and sensitivity setting, depending on the purpose of the experiment and the instrument available. Described here is one of the recommended procedures for determining the enzymatic cleavage site by the combination of the fluorometric analysis and liquid chromatography-mass spectrometry (LC-MS) analysis.

i) Primary screening: selection of the favored Xaa

- Substrate solution for primary screening (PS solution): Dilute 20 µl of each of the above substrate stock solution with 1980 µl of an appropriate buffer (10 µM)
- Reference compounds solution for primary screening (PR solution): Dilute 20 µl of the above reference compounds stock solution with 1980 µl of an appropriate buffer (10 µM)

1) Set a fluorescence spectrophotometer at λex = 340 nm and λem = 440 nm
2) Mix one of the PS solution and the PR solution in ratios of 10/0, 9/1, 8/2, 5/5 and 0/10
3) Measure the fluorescence of the prepared solutions to obtain the calibration curve for the cleaved products
4) Pipette 200 µl each of all PS solutions into the cells and incubate them in the fluorescence spectrophotometer for 3 min (temperature equilibration)
5) Measure the fluorescence of each solution (initial fluorescence blank)
6) Add an appropriate volume of enzyme solution
7) Record the increase of the fluorescence intensity
8) Terminate the enzymatic reaction by using a proper inhibitor (leupeptin, E-64, pepstatin, EDTA and so on) or changing the pH of the reaction medium (using TCA, AcOH, NaOH and so on)
9) Choose the best Xaa-containing substrate for secondary screening

ii) Secondary screening: identification of the specificity of the enzyme (I)

- Substrate solution for secondary screening (SS solution): Dilute 200 µl of the stock solution of the best Xaa-containing substrate chosen by the above primary screening with 1800 µl of an appropriate buffer (100 µM)
- Reference compounds solution for secondary screening (SR solution): Dilute 200 µl of the above reference compounds stock solution with 1800 µl of an appropriate buffer (100 µM)

1) Set a fluorescence spectrophotometer at λex = 340 nm and λem = 440 nm
2) Mix the SS solution and the SR solution in ratios of 100/0, 95/5, 90/10, 80/20, 50/50 and 0/100
3) Measure the fluorescence of the prepared solutions to obtain the calibration curve for the cleaved products
4) Pipette 200 µl of the SS solution into the cells and incubate them in the fluorescence spectrophotometer for 3 min (temperature equilibration)
5) Measure the fluorescence of each solution (initial fluorescence blank)
6) Add an appropriate volume of enzyme solution
7) Record the increase of the fluorescence intensity
8) Terminate the enzymatic reaction by using a proper inhibitor or changing the pH of the reaction medium upon completion of the reaction at the points of 0%, 5%, 10% and 20% of the total
9) Subject 100 µl aliquots to LC-MS

iii) LC-MS: identification of the specificity of the enzyme (II)

・Analytical conditions

column: ODS

eluant: A) H_2O containing 0.05% TFA, B) CH_3CN containing 0.05% TFA

gradient: 10% to 40% B) in A) over 50 min

detection: UV at 220 nm and 400 nm or fluorescence

1) Inject 100 µl aliquots of each terminated solution at different stage of the reaction
2) Measure the MW of the cleaved product(s) in the peak(s) with the absorbance at 220 nm but not with 400 nm [identification of the N-terminal segment(s)]
3) Deduce their structure from the attached list of the theoretical MW for the cleaved products

* Comment 1: If the N-terminal segment has the identical retention time to the C-terminal segment or one of the starting uncleaved substrates, detection of the products by fluorescence is recommended.

* Comment 2: In the accidental case where the two products with the same MW (ex. Zaa-Yaa=Phe-Asp and Val-Tyr, Glu-Asp and Phe-Pro) are generated from one of the substrate, their analyses should be carried out by MS-MS sequencing and/or by Edman degradation.

Usefulness and limitation of FRETS-25Xaa series for screening of substrate specificities of proteases

We have confirmed that FRETS-25Xaa series are effectively used for the assay of numerous proteases such as trypsin, chymotyrpsin, elastase, thrombin, papain, calpain, pepsin and thermolysin. However, they did not work well for the assay of caspase-3 and furin, probably because they have only three changeable sites (Zaa-Yaa-Xaa) in each substrate (deficiency of P4 site). This fact implies that FRETS-25Xaa might not be applicable to the assay of an enzyme with wide range interacting sites with substrate.

Custom services for secondary screening (Domestic Service only)

For the procedure iii) above using FRETS25-Xaa library, we will accept the analysis of the enzymatic reaction mixture by ESI-MS in a LC mode. The analytical data to identify the specificity of the enzyme of interest will be provided within 3 weeks. Please refer other conditions concerning this custom service on page 360 in this catalog (only in Japanese). For further information, please contact us at custom@peptide.co.jp (E-mail).

References of FRETS-25Xaa series

1) K. Takada, M. Tsunemi, Y. Nishiuchi, and T. Kimura, A Fluorescence Resonance Energy Transfer Substrate (FRETS) Library for Determining Protease Specificity. *Peptide Revolution: Genomics, Proteomics & Therapeutics (Proceedings of the 18th American Peptide Symposium)*, 327 (2003).
2) S. Tanskul, K. Oda, H. Oyama, N. Noparatnaraporn, M. Tsunemi, and K. Takada, Substrate specificity of alkaline serine proteinase isolated from photosynthetic bacterium, *Rubrivivax gelatinosus* KDDS1. *Biochem. Biophys. Res. Commun.*, **309**, 547 (2003).

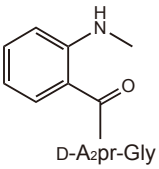
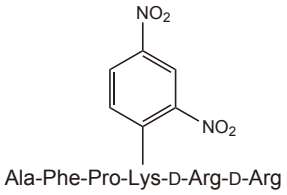
FRETS (Peptide) Library (continued)

Code	Compound			Price:Yen
3701-v -20℃	**FRETS-25Ala** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Ala-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3702-v -20℃	**FRETS-25Arg** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Arg-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3703-v -20℃	**FRETS-25Asn** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Asn-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3704-v -20℃	**FRETS-25Asp** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Asp-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3705-v -20℃	**FRETS-25Gln** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Gln-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3706-v -20℃	**FRETS-25Glu** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Glu-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3707-v -20℃	**FRETS-25Gly** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Gly-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000

Code	Compound			Price:Yen
3708-v -20℃	**FRETS-25His** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-His-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3709-v -20℃	**FRETS-25Ile** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Ile-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3710-v -20℃	**FRETS-25Leu** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Leu-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3711-v -20℃	**FRETS-25Lys** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Lys-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3712-v -20℃	**FRETS-25Met** (Trifluoroacetate Form) D-A2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Met-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3713-v -20℃	**FRETS-25Phe** (Trifluoroacetate Form) D-A2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Phe-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3714-v -20℃	**FRETS-25Pro** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Pro-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000

FRETS (Peptide) Library (continued)

Code	Compound			Price:Yen
3715-v -20℃	**FRETS-25Ser** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Ser-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3716-v -20℃	**FRETS-25Thr** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Thr-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3717-v -20℃	**FRETS-25Trp** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Trp-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3718-v -20℃	**FRETS-25Tyr** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Tyr-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000
3719-v -20℃	**FRETS-25Val** (Trifluoroacetate Form) D-A_2pr(Nma)-Gly-[Phe/Ala/Val/Glu/Arg]-[Pro/Tyr/Lys/Ile/Asp]-Val-Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg A_2pr(Nma):N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) *Fluorescence-Quenching Substrate Library*	Vial	1 μmol	10,000

Code	Compound			Price:Yen
3720-v −20℃	**FRETS-25-STD1** D-A_2pr(Nma)-Gly (A_2pr(Nma): N^{β}-[2-(Methylamino)benzoyl]-2,3-diaminopropionic acid) (M.W. 294.31) $C_{13}H_{18}N_4O_4$  *Standard Compound 1 for Fluorescence-Quenching Substrate Library FRETS-25Xaa Series*	Vial	1 μmol	2,000
3721-v −20℃	**FRETS-25-STD2** (Trifluoroacetate Form) Ala-Phe-Pro-Lys(Dnp)-D-Arg-D-Arg (Lys(Dnp): N^{ε}-(2,4-Dinitrophenyl)lysine) (M.W. 940.02) $C_{41}H_{61}N_{15}O_{11}$  *Standard Compound 2 for Fluorescence-Quenching Substrate Library FRETS-25Xaa Series*	Vial	1 μmol	2,000

Peptide Tools

Code	Compound			Price:Yen
3402-s	**Biotinyl-ω-Agatoxin IVA**	Vial	0.1 mg	35,000
New	**Biotinyl-ω-Aga-IVA**			
-20℃	(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

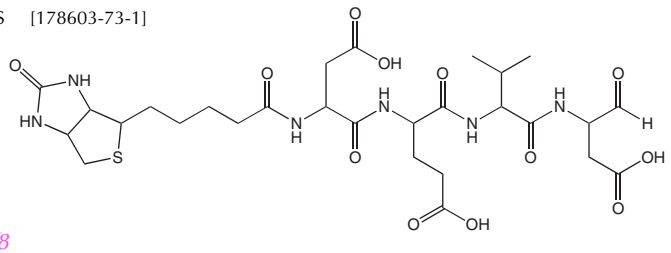
1) H. Nishio, K. Y. Kumagaye, S. Kubo, Y.-N. Chen, A. Momiyama, T. Takahashi, T. Kimura, and S. Sakakibara, *Biochem. Biophys. Res. Commun.*, **196**, 1447 (1993). (*Chem. Synthesis & Biological Activity*)
2) S. Nakanishi, A. Fujii, T. Kimura, S. Sakakibara, and K. Mikoshiba, *J. Neurosci. Res.*, **41**,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

Code	Compound			Price:Yen
3173-v	**Biotinyl-Asp-Glu-Val-Asp-H (aldehyde)**	Vial	1 mg	10,000
-20℃	**[Biotin-DEVD-CHO]**			

Biotinyl-L-aspartyl-L-glutamyl-L-valyl-L-aspart-1-al

(M.W. 686.73) $C_{28}H_{42}N_{6}O_{12}S$ [178603-73-1]

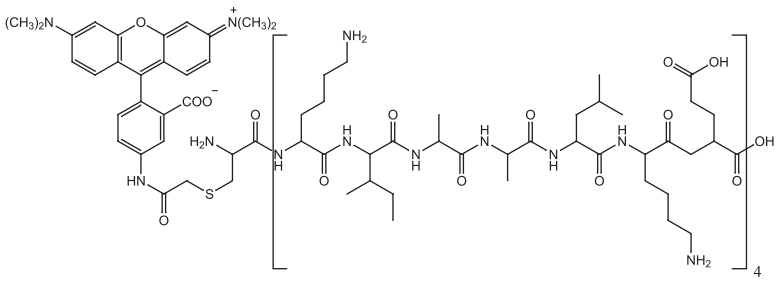
Synthetic Product



Inhibitor for Caspase-3/7/8

1) D.W. Nicholson, A. Ali, N.A. Thornberry, J.P. Vaillancourt, C.K. Ding, M. Gallant, Y. Gareau, P.R. Griffin, M. Labelle, Y.A. Lazebnik, N.A. Munday, S.M. Raju, M.E. Smulson, T.-T. Yamin, V.L. Yu, and D.K. Miller, *Nature*, **376**, 37 (1995).

Code	Compound			Price:Yen
3401-v New -20℃	**TMRIA-K4** (Trifluoroacetate Form) *S*-[2-({4-[3,6-Bis(dimethylamino)xanthylium-9-yl]-3-carboxyphenyl}amino)-2-oxoethyl]-Cys-(Lys-Ile-Ala-Ala-Leu-Lys-Glu)$_4$	Vial	10 μg	16,000



(M.W. 3578.4) $C_{169}H_{282}N_{40}O_{42}S$

Fluorophore Peptide in Coiled-Coil Tag-Probe Labeling System

Genetic fusion of a fluorescent protein to a target protein for specific labeling in living cells has been widely used. However, the use of fluorescent proteins with a considerable size, such as GFP (ca 27 kDa), may give artifactual results, for example, formation of aggregates or impairment of protein function. Post-translational labeling methods with smaller fluorophores are superior to those with fluorescent proteins.

Recently, Professor Matsuzaki of Kyoto University developed a useful receptor detection method called "coiled-coil tag-probe system" [1]. This is a rapid method with a small tag (21 amino acids) for the fluorescence labeling of cell-surface receptors using a high affinity coiled-coil formation without metals or enzymes. The concept of this method is as follows: **1)** E3 [E3 = (EIAALEK)$_3$] is fused to the expressed receptor of interest as the tag, **2)** K4 [K4 = (KIAALKE)$_4$] probe is labeled by the fluorophore at its α-amino group, such as tetramethylrhodamine (abbreviated as TMR-K4), and **3)** interaction of E3 tag with TMR-K4 probe by forming heterodimeric coiled-coil makes the detection of the expressed receptor in living cells possible. Labeling by TMR-K4 is sensitive (Kd = 6 nM) as well as non-toxic to cells. A low concentration of 20 nM is sufficient for practical use.

In collaboration with Professor Matsuzaki, we have now successfully synthesized an analog of TMR-K4 called TMRIA-K4 [TMRIA = tetramethylrhodamine-5-iodoacetamide]. Actually, in contrast to TMR-K4 in which the fluorophore was attached to the α-amino group, the fluorophore functionality of TMRIA-K4 was introduced via the side-chain SH group of the Cys residue, which was extended at the amino-terminus of K4. We have confirmed this novel probe exhibits compatible characteristics to TMR-K4 (Kd = 2 nM).

This newly designed fluorescent-tag probe, TMRIA-K4, should be an alternative to the originally designed TMR-K4, which is now available from Peptide Institute, Inc.

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

- This compound is distributed through Peptide Institute, Inc. under the license of Kyoto University.

Code	Compound			Price:Yen
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
4230-v -20℃	**Tyrosyl-BNP-32 (Human)** **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*	Vial	0.5 mg	48,000
4141-s -20℃	**Tyrosyl-CRF (Human, Rat)** **Tyrosyl-Corticotropin Releasing Factor (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
4251-v -20℃	**Tyrosyl-CNP-22 (Human)** **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.*)	Vial	0.5 mg	43,000

Code	Compound			Price:Yen
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*	Vial	0.5 mg	11,000
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

1) A. Arimura, H. Sato, D.H. Coy, and A.V. Schally, *Proc. Soc. Exp. Biol. Med.*, **148**, 784 (1975). (*Original*)

Enzymes

Code	Compound		Price:Yen
3504	**Thermolysin**	100 mg	5,800
4℃	(Daiwa Kasei K.K.)	1 g	32,000
	(Crystallized and lyophilized from *Bacillus thermoproteolyticus*)		
	Powder containing ca. 30% buffer salts as calcium and sodium acetate		
	ca. 8000 PU/mg protein		

Polypeptides

Code	Compound		Price:Yen
4005	**(Pro-Pro-Gly)$_5$ • xH$_2$O**	25 mg	5,000
-20℃	(M.W. 1274.4) $C_{60}H_{87}N_{15}O_{16}$	100 mg	14,700
	Purity: higher than 97% by HPLC	1 g	112,000
	1) K. Kivirrikko, K. Suga, Y. Kishida, S. Sakakibara, and D.J. Prockop, *Biochem. Biophys. Res. Commun.*, **45**, 1591 (1971). (*Chem. Synthesis & Biochem.*)		
4006	**(Pro-Pro-Gly)$_{10}$ • xH$_2$O**	25 mg	7,300
-20℃	(M.W. 2530.8) $C_{120}H_{172}N_{30}O_{31}$	100 mg	22,000
	Purity: higher than 95% by HPLC	1 g	180,000
	1) S. Sakakibara, Y. Kishida, Y. Kikuchi, R. Sakai, and K. Kakiuchi, *Bull. Chem. Soc. Jpn.*, **41**, 1273 (1968). (*Chem. Synthesis*)		
4032	**(Pro-Hyp-Gly)$_5$ • xH$_2$O**	25 mg	35,000
-20℃	(M.W. 1354.4) $C_{60}H_{87}N_{15}O_{21}$	100 mg	120,000
	Purity: higher than 96% by HPLC		
	1) S. Sakakibara, K. Inouye, K. Shudo, Y. Kishida, Y. Kobayashi, and D.J. Prockop, *Biochim. Biophys. Acta*, **303**, 198 (1973). (*Chem. Synthesis*)		
4033	**(Pro-Hyp-Gly)$_{10}$ • xH$_2$O**	25 mg	52,000
-20℃	(M.W. 2690.8) $C_{120}H_{172}N_{30}O_{41}$	100 mg	185,000
	Purity: higher than 90% by HPLC		
	1) S. Sakakibara, K. Inouye, K. Shudo, Y. Kishida, Y. Kobayashi, and D.J. Prockop, *Biochim. Biophys. Acta*, **303**, 198 (1973). (*Chem. Synthesis*)		
3063	**Poly-L-Glutamic Acid Sodium Salt**	0.1 g	6,000
2～10℃	M.W. >8000, cut off by dialysis,	1 g	30,000
	NCA polymerized product		
3056	**Poly-L-Lysine Hydrobromide**	0.1 g	6,000
2～10℃	M.W. >8000, cut off by dialysis,	1 g	30,000
	NCA polymerized product [25988-63-0]		
3075	**Poly-L-Lysine Hydrochloride**	0.1 g	6,000
2～10℃	M.W. >8000, cut off by dialysis,	1 g	30,000
	NCA polymerized product [26124-78-7]		

Oligopeptides

Dipeptides

Code	Compound	Quantity	Price:Yen	Page
3085 2～10℃	**β-Ala-His** **[Carnosine]**	1 g 5 g	2,800 6,800	208
3080 2～10℃	**Glu-Glu**	0.1 g 1 g	3,400 17,800	216
3028 2～10℃	**Gly-Gly**	5 g 25 g 100 g	1,800 2,800 7,000	217
3022 2～10℃	**Gly-Leu**	0.1 g 1 g 5 g	1,700 3,100 9,000	217
3053 2～10℃	**Gly-Phe**	0.1 g 1 g	1,800 3,200	217
3023 2～10℃	**Gly-Phe-NH_2** • AcOH	0.1 g 1 g	2,300 7,100	217
3052 2～10℃	**Gly-Pro**	0.1 g 1 g	1,900 5,000	217
3065 2～10℃	**His-Leu**	0.1 g 1 g	2,500 8,800	218
3024 2～10℃	**Leu-Gly** • $^1/_2H_2O$	0.1 g 1 g	2,000 4,600	218
4070 -20℃	***cyclo* (Leu-Gly)** **[Morphine Tolerance Peptide]**	25 mg 100 mg	4,100 11,400	95
3152 2～10℃	**Met-Met**	0.1 g 1 g	3,200 15,000	219
3079 2～10℃	**Pyr-Ala**	0.1 g 1 g	2,700 11,400	223

Tripeptides

Code	Compound	Quantity	Price:Yen	Page
3050 2～10℃	**Glu(Cys-Gly)** **[Glutathione; GSH]**	1 g 5 g 25 g	1,800 2,700 6,100	217
3061 2～10℃	**Gly-Gly-Gly**	1 g 5 g 25 g	2,600 7,000 27,500	217
3076 2～10℃	**Gly-Gly-His**	0.1 g 1 g	4,400 30,000	217
4022 -20℃	**Gly-His-Lys** • AcOH • H_2O **[Liver-Cell Growth Factor]**	25 mg 100 mg	7,500 15,400	89
4132 -20℃	**Ile-Pro-Ile** • H_2O **[Diprotin A]**	25 mg 100 mg	4,800 13,300	187
3025 2～10℃	**Leu-Gly-Gly**	0.1 g 1 g	2,400 9,700	218
4024 -20℃	**Pro-Leu-Gly-NH_2** • $^1/_2H_2O$ **[MSH-Release Inhibiting Factor; MIF]**	25 mg 100 mg	2,200 5,000	94
4011 -20℃	**Pyr-His-Pro-NH_2** • H_2O **[Thyrotropin Releasing Hormone; TRH]**	25 mg 100 mg	4,500 12,200	147
4061 -20℃	**Thr-Val-Leu** **[Schizophrenia Related Peptide]**	25 mg 100 mg	8,300 17,000	138

Tetrapeptides

Code	Compound	Quantity	Price:Yen	Page
4171 -20℃	**Arg-Gly-Asp-Ser** • $^1/_2$AcOH • $2H_2O$ **[Fibronectin Active Fragment (RGDS)]**	25 mg 100 mg	24,000 75,000	23
3119 2～10℃	**Gly-Gly-Tyr-Arg** • AcOH •$2H_2O$	0.1 g 1 g	5,800 30,000	217
4142 -20℃	**Phe-Met-Arg-Phe-NH_2** • 1 $^1/_2$AcOH • $2H_2O$ **[FMRF-Amide]**	25 mg 100 mg	23,000 65,000	95
4020 -20℃	**Thr-Lys-Pro-Arg** • 2AcOH • $4H_2O$ **[Tuftsin]**	25 mg 100 mg	12,000 36,000	147
4083 -20℃	**Trp-Met-Asp-Phe-NH_2** • HCl • H_2O **[CCK-Tetrapeptide (30-33)]**	25 mg 100 mg	9,000 27,000	36
4334 -20℃	**Tyr-Pro-Phe-Phe-NH_2** • AcOH • H_2O **[Endomorphin-2]**	25 mg	48,000	58
4333 -20℃	**Tyr-Pro-Trp-Phe-NH_2** • AcOH • H_2O **[Endomorphin-1]**	25 mg	48,000	57