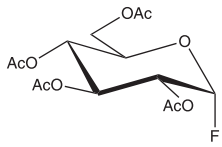
Carbohydrates and Conjugates

Carbohydrates and Conjugates

Code	Compound		Price:Yen
22001	**2,3,4,6-Tetra-*O*-Acetyl-α-D-Glucopyranosyl Fluoride**	1 g	15,000
-20℃		5 g	50,000

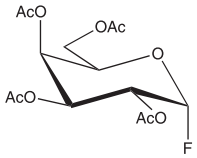


(M.W. 350.29) $C_{14}H_{19}O_9F$ [3934-29-0]

Glycosyl Donor (Glycosyl Fluoride)

1) M. Hayashi, S Hashimoto, and R. Noyori, *Chem. Lett.*, 1747 (1984).
2) W.A. Szarek, G. Grynkiewicz, B. Doboszewski, and G.W. Hay, *Chem. Lett.*, 1751 (1984).
3) B. Ernst and T. Winkler, *Tetrahedron Lett.*, **30**, 3081 (1989).
4) S. Caddick, W.B. Motherwell, and J.A. Wilkinson, *J. Chem. Soc. Chem. Commun.*, 674 (1991).

Code	Compound		Price:Yen
22002	**2,3,4,6-Tetra-*O*-Acetyl-α-D-Galactopyranosyl Fluoride**	1 g	15,000
-20℃		5 g	50,000

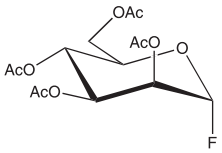


(M.W. 350.29) $C_{14}H_{19}O_9F$ [4163-44-4]

Glycosyl Donor (Glycosyl Fluoride)

1) W.A. Szarek, G. Grynkiewicz, B. Doboszewski, and G.W. Hay, *Chem. Lett.*, 1751 (1984).
2) B. Ernst and T. Winkler, *Tetrahedron Lett.*, **30**, 3081 (1989).
3) S. Caddick, W.B. Motherwell, and J.A. Wilkinson, *J. Chem. Soc. Chem. Commun.*, 674 (1991).

Code	Compound		Price:Yen
22003	**2,3,4,6-Tetra-*O*-Acetyl-α-D-Mannopyranosyl Fluoride**	1 g	15,000
-20℃		5 g	50,000

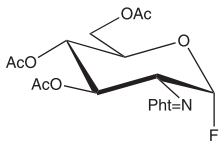


(M.W. 350.29) $C_{14}H_{19}O_9F$

Glycosyl Donor (Glycosyl Fluoride)

1) W.A. Szarek, G. Grynkiewicz, B. Doboszewski, and G.W. Hay, *Chem. Lett.*, 1751 (1984).
2) B. Ernst and T. Winkler, *Tetrahedron Lett.*, **30**, 3081 (1989).
3) S. Caddick, W.B. Motherwell, and J.A. Wilkinson, *J. Chem. Soc. Chem. Commun.*, 674 (1991).

Code	Compound		Price:Yen
22004	**2-Deoxy-2-Phthalimido-3,4,6-Tri-*O*-Acetyl-α-D-Glucopyranosyl Fluoride**	1 g	20,000
-20℃		5 g	65,000

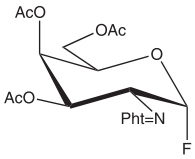


(M.W. 437.37) $C_{20}H_{20}NO_9F$

Glycosyl Donor (Glycosyl Fluoride)

1) C. Unverzagt and H. Kunz, *J. Prakt. Chem., Chem.-Ztg*, **334**, 570 (1992).

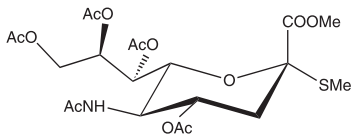
22005	**2-Deoxy-2-Phthalimido-3,4,6-Tri-*O*-Acetyl-α-D-Galactopyranosyl Fluoride**	1 g	25,000
-20℃		5 g	80,000



(M.W. 437.37) $C_{20}H_{20}NO_9F$

Glycosyl Donor (Glycosyl Fluoride)

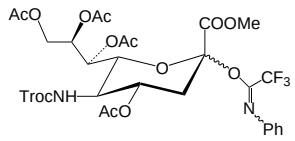
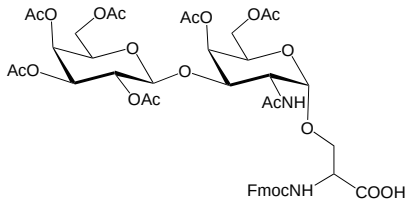
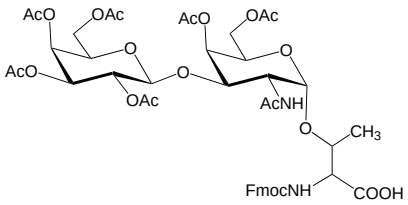
22101	**Methyl (Methyl 5-Acetamido-4,7,8,9-Tetra-*O*-Acetyl-3,5-Dideoxy-2-Thio-D-Glycero-D-Galacto-2-Nonulopyranosid)onate**	1 g	50,000
-20℃		5 g	200,000



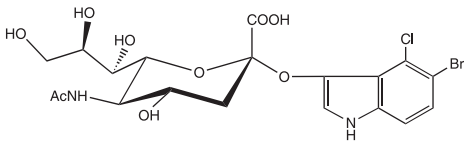
(M.W. 521.54) $C_{21}H_{31}NO_{12}S$

Glycosyl Donor (Thioglycoside)

1) I.M. Privalova and A.Y. Khorlin, *Izv. Akad. Nauk SSSR, Ser. Khim.*, 2785 (1969).
2) O. Kanie, M. Kiso, and A. Hasegawa, *J. Carbohydr. Chem.*, **7**, 501 (1988).
3) T. Yamamoto, T. Teshima, U. Saitoh, M. Hoshi, and T. Shiba, *Tetrahedron Lett.*, **35**, 2701 (1994).

Code	Compound			Price:Yen
22102 -20℃	**Methyl 4,7,8,9-Tetra-*O*-Acetyl-3,5-Dideoxy-5-(2,2,2-Trichloroethoxycarbonylamino)-D-Glycero-D-Galacto-2-Nonulopyranosylonate-2-*N*-Phenyltrifluoroacetimidate**  (M.W. 795.92) $C_{29}H_{32}N_2O_{14}Cl_3F_3$ *Glycosyl Donor (Phenyltrifluoroacetimidate)* 1) K. Tanaka, T. Goi, and K. Fukase, *Synlett*, 2958 (2005). 2) S. Tanaka, T. Goi, K. Tanaka, and K. Fukase, *J. Carbohydr. Chem.*, **26**, 369 (2007).	Bulk	500 mg 1 g	50,000 80,000
22103 -20℃	**Fmoc-Ser[Ac$_4$Galβ(1→3)Ac$_2$GalNAcα(1→O)]** *O*-β-2,3,4,6-Tetra-*O*-acetyl-D-galactopyranosyl-(1→3)-*O*-α-4,6-di-*O*-acetyl-2-acetamido-2-deoxy-D-galactopyranosyl-(1→O)-9-fluorenylmethoxycarbonyl-L-serine  (M.W. 944.88) $C_{44}H_{52}N_2O_{21}$ *Reagent for Mucin-Type O-Glycopeptide Synthesis* 1) T. Reipen and H. Kunz, *Synthesis*, 2487 (2003).	Bulk	25 mg	80,000
22104 -20℃	**Fmoc-Thr[Ac$_4$Galβ(1→3)Ac$_2$GalNAcα(1→O)]** *O*-β-2,3,4,6-Tetra-*O*-acetyl-D-galactopyranosyl-(1→3)-*O*-α-4,6-di-*O*-acetyl-2-acetamido-2-deoxy-D-galactopyranosyl-(1→O)-9-fluorenylmethoxycarbonyl-L-threonine  (M.W. 958.91) $C_{45}H_{54}N_2O_{21}$ *Reagent for Mucin-Type O-Glycopeptide Synthesis* 1) C. Brocke and H. Kunz, *Synthesis*, 525 (2004).	Bulk	25 mg	80,000

Code	Compound			Price:Yen
23001-v -20℃	**5-Bromo-4-Chloroindol-3-yl 5-Acetamido-3,5-Dideoxy-α-D-Glycero-D-Galacto-2-Nonulopyranosidonic Acid** **[X-Neu5Ac, X-Sialic Acid, X-NANA]** (Ammonium Form)	Vial	5 mg	10,000

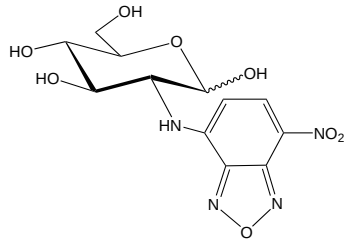


(M.W. 537.74) $C_{19}H_{22}N_2O_9BrCl$ [265979-52-0]

Histochemical Substrate for Neuraminidase

1) I. Fujii, Y. Iwabuchi, T. Teshima, T. Shiba, and M. Kikuchi, *Bioorg. Med. Chem.*, **1**, 147 (1993). (*Original*; Synthesis)

Code	Compound			Price:Yen
23002-v -20℃	**2-[*N*-(7-Nitrobenz-2-Oxa-1,3-Diazol-4-yl)Amino]-2-Deoxy-D-Glucose** **2-NBDG**	Vial	0.5 mg	5,000



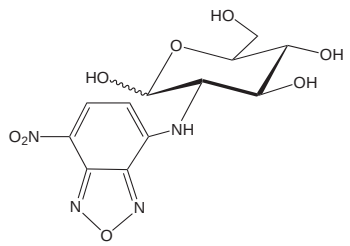
(M.W. 342.26) $C_{12}H_{14}N_4O_8$ [186689-07-6]

Reagent for Monitoring Glucose Uptake into Single, Living Cells

1) K. Yoshioka, H. Takahashi, T. Homma, M. Saito, K.-B. Oh, Y. Nemoto, and H. Matsuoka, *Biochim. Biophys. Acta*, **1289**, 5 (1996). (*Original*)
2) K. Yamada, M. Nakata, N. Horimoto, M. Saito, H. Matsuoka, and N. Inagaki, *J. Biol. Chem.*, **275**, 22278 (2000). (*Measurement of Glucose Uptake in Living Mammalian Cells*)
3) K. Yamada, M. Saito, H. Matsuoka, and N. Inagaki, *Nature Protocols*, **2**, 753 (2007). (*Chem. Synthesis & Protocols for Measurement*)
4) J.V. Rocheleau, G.M. Walker, W.S. Head, O.P. McGuinness, and D.W. Piston, *Proc. Natl. Acad. Sci. U.S.A.*, **101**, 12899 (2004). (*Monitoring of Glucose Uptake in Islet*)

- This compound is distributed through Peptide Institute, Inc. under the license of Tokyo University of Agriculture and Technology.

Code	Compound			Price:Yen
23003-v New -20℃	**2-[*N*-(7-Nitrobenz-2-Oxa-1,3-Diazol-4-yl)Amino]-2-Deoxy-L-Glucose** **2-NBDLG**	Vial	0.5 mg	15,000



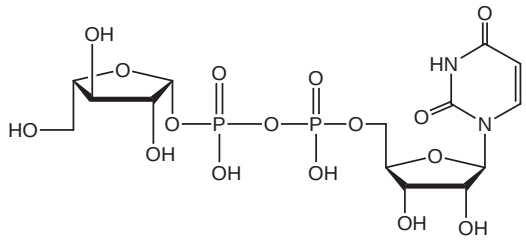
(M.W. 342.26) $C_{12}H_{14}N_4O_8$ [1092935-76-6]

Control Substrate for 2-NBDG

1) T. Yamamoto, Y. Nishiuchi, T. Teshima, H. Matsuoka, and K. Yamada, *Tetrahedron Lett.*, **49**, 6876 (2008). (*Chem. Synthesis*)
2) K. Yamada, M. Saito, H. Matsuoka, and N. Inagaki, *Nature Protocols*, **2**, 753 (2007). (*Protocols for Measurement*)

- This compound is distributed through Peptide Institute, Inc. under the license of Hirosaki University Graduate School of Medicine, Tokyo University of Agriculture and Technology, and Peptide Institute, Inc.

Code	Compound			Price:Yen
23005-s New -20℃	**UDP-β-L-Arabinofuranose** **UDP-β-L-Ara*f*** (Triethylammonium Form) Uridine-5'-diphospho-β-L-arabinofuranose	Vial	0.1 mg	18,000

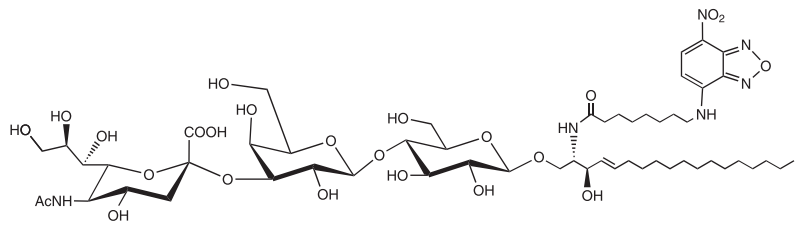


(M.W. 536.28) $C_{14}H_{22}N_2O_{16}P_2$

Reagent for Research in Arabinofuranose Biogenesis in Plants

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

24001-s -20℃	***O*-(Acetamido-3,5-Dideoxy-D-Glycero-α-D-Galacto-2-Nonulopyranosylonic Acid)-(2→3)-*O*-β-D-Galactopyranosyl-(1→4)-*O*-β-D-Glucopyranosyl-(1→1)-(2*S*,3*R*,4*E*)-2-*N*-(7-Nitrobenz-2-Oxa-1,3-Diazol-4-yl)Aminooctanamido-4-Octadecene-1,3-diol** **[GM3 Labelled by NBD]** (Ammonium Form)	Vial	0.1 mg	20,000



(M.W. 1219.3) $C_{55}H_{90}N_6O_{24}$

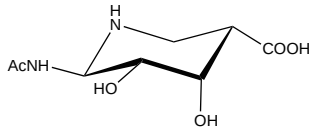
Synthetic Product

Fluorescence Labelled Ganglioside

1) K. Akiyoshi, A. Itaya, S.M. Nomura, N. Ono, and K. Yoshikawa, *FEBS Lett.*, **534**, 33 (2003). (*Physicochemical Role of Gangliosides*)

****** Glycosidase Inhibitors ******

Code	Compound			Price:Yen
24002-v -20℃	**Siastatin B** (3*S*,4*S*,5*R*,6*R*)-6-(Acetylamino)-4,5-dihydroxy-3-piperidinecarboxylic acid	Vial	5 mg	10,000



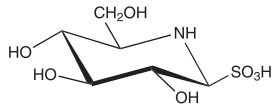
(M.W. 218.21) $C_8H_{14}N_2O_5$ [54795-58-3]
Microbial Product

Inhibitor for Sialidase

1) H. Umezawa, T. Aoyagi, T. Komiyama, H. Morishima, M. Hamada, and T. Takeuchi, *J. Antibiotics*, **27**, 963 (1974). (*Original*)

- This compound is distributed through Peptide Institute, Inc. under the technical and scientific advices of Microbial Chemistry Research Foundation.

24003-v -20℃	**Nojirimycin Bisulfite** 5-Amino-5-deoxy-glucopyranose bisulfite	Vial	5 mg	4,800

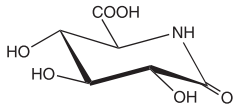


(M.W. 243.23) $C_6H_{13}NO_7S$
Microbial Product

Inhibitor for β-Glucosidase (Apricot Emulsin)

1) T. Niwa, S. Inouye, T. Tsuruoka, Y. Koaze, and T. Niida, *Agric. Biol. Chem.*, **34**, 966 (1970). (*Original*)

24004-v -20℃	**D-Glucaro-δ-Lactam** (Potassium Salt) (2*S*,3*R*,4*S*,5*R*)-3,4,5-Trihydroxy-6-oxo-2-piperidinecarboxylic acid	Vial	5 mg	6,500



(M.W. 191.14) $C_6H_9NO_6$
Microbial Product

Inhibitor for Bovine Liver β-Glucuronidase

1) T. Niwa, T. Tsuruoka, S. Inouye, Y. Naito, T. Koeda, and T. Niida, *J. Biochem.*, **72**, 207 (1972). (*Original*)

****** Endotoxins (Synthetic) ******

Code	Compound	Price:Yen

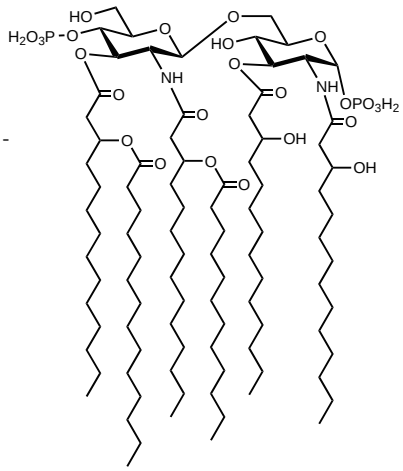
24005-s **Lipid A (*E. coli*)** Vial 0.1 mg 20,000

-20℃

Compound 506, LA-15-PP

(Triethylammonium Form)

2-Deoxy-6-*O*-[2-deoxy-2-[(*R*)-3-(dodecanoyloxy) tetradecanoylamino]-3-*O*-[(*R*)-3-(tetradecanoyloxy) tetradecanoyl]-β-D-glucopyranosyl]-3-*O*-[(*R*)-3-hydroxytetradecanoyl]-2-[(*R*)-3-hydroxytetradecanoylamino]-α-D-glucopyranose 1,4'-diphosphate



(M.W. 1798.4) $C_{94}H_{178}N_2O_{25}P_2$ [95991-05-2]

Synthetic Product

Active Principle of Endotoxin

1) M. Imoto, S. Kusumoto, T. Shiba, E.Th. Rietschel, C. Galanos, and O. Lüderitz, *Tetrahedron Lett.*, **26**, 907 (1985). (*Original; Chem. Structure*)
2) M. Imoto, H. Yoshimura, T. Shimamoto, N. Sakaguchi, S. Kusumoto, and T. Shiba, *Bull. Chem. Soc. Jpn.*, **60**, 2205 (1987). (*Chem. Synthesis*)

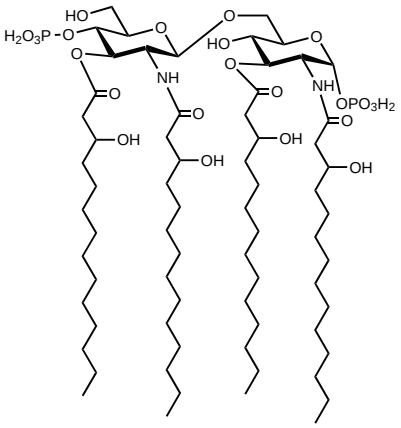
24006-s **Lipid IVa** Vial 0.1 mg 20,000

-20℃

Compound 406, LA-14-PP, Precursor Ia

(Triethylammonium Form)

2-Deoxy-6-*O*-[2-deoxy-3-*O*-[(*R*)-3-hydroxytetradecanoyl]-2-[(*R*)-3-hydroxytetradecanoylamino]-β-D-glucopyranosyl]-3-*O*-[(*R*)-3-hydroxytetradecanoyl]-2-[(*R*)-3-hydroxytetradecanoyl-amino]-α-D-glucopyranose 1,4'-diphosphate



(M.W. 1405.7) $C_{68}H_{130}N_2O_{23}P_2$

Synthetic Product

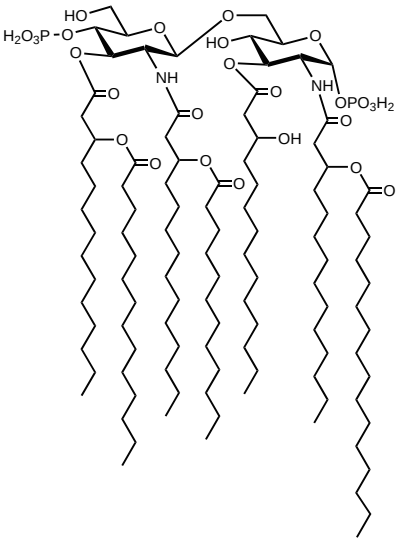
Biosynthetic Precursor of Lipopolysaccharide

1) M. Imoto, S. Kusumoto, T. Shiba, E.Th. Rietschel, C. Galanos, and O. Lüderitz, *Tetrahedron Lett.*, **26**, 907 (1985). (*Original; Chem. Structure*)
2) M. Imoto, H. Yoshimura, M. Yamamoto, T. Shimamoto, S. Kusumoto, and T. Shiba, *Bull. Chem. Soc. Jpn.*, **60**, 2197 (1987). (*Chem. Synthesis*)

Code	Compound			Price:Yen
24008-s	**Lipid A (*Salmonella*)**	Vial	0.1 mg	20,000

-20℃

(Triethylammonium Form)
2-Deoxy-6-*O*-{2-deoxy-2-[(*R*)-3-(dodecanoyloxy)tetradecanoylamino]-3-*O*-[(*R*)-3-(tetradecanoyloxy)tetradecanoyl]-β-D-glucopyranosyl}-2-[(*R*)-3-(hexadecanoyloxy)tetradecanoylamino]-3-*O*-[(*R*)-3-hydroxytetradecanoyl]-α-D-glucopyranose 1,4'-diphosphate

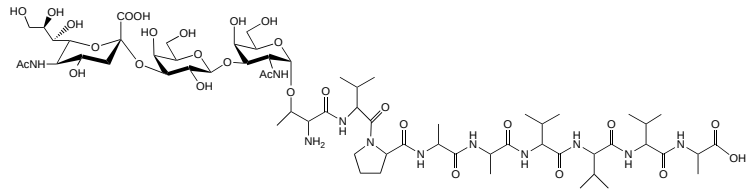


(M.W. 2036.8) $C_{110}H_{208}N_2O_{26}P_2$
Synthetic Product

Active Principle of Endotoxin

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

Code	Compound			Price:Yen
24007-v -20℃	**Antiproliferative Factor Sialoglycopeptide** **APF Sialoglycopeptide** **Thr[Neu5Acα(2→3)Galβ(1→3)GalNAcα(1→O)]^{541}-Frizzled 8 (541-549)** (Ammonium Form) *O*-(Acetamido-3,5-dideoxy-D-glycero-α-D-galacto-2-nonulopyranosylonic acid)-(2→3)-*O*-β-D-galactopyranosyl-(1→3)-*O*-α-2-acetamido-2-deoxy-D-galactopyranosyl-(1→O)-Thr-Val-Pro-Ala-Ala-Val-Val-Val-Ala	Vial	50 μg	20,000



(M.W. 1482.6) $C_{63}H_{107}N_{11}O_{29}$

Synthetic Product

Antiproliferative Factor from Interstitial Cystitis Patients

For over 40 years, we have been engaged in synthesizing biologically active peptides with variable post-translational modifications. Glycopeptides are included in our synthetic repertoire. These peptides contain a carbohydrate moiety introduced through the side chain of Ser/Thr/Asn, which in turn, affects more or less its intrinsic activity. For the synthesis of glycopeptides, the knowledge of carbohydrate chemistry, as well as that of peptide chemistry, is required.

Antiproliferative factor sialoglycopeptide was isolated from the bladder of the patients with interstitial cystitis[1]. Recently, the peptide portion of this factor has been elucidated to correspond to (541-549) of the 6th transmembrane region of frizzled 8. Simultaneously, the structure of the carbohydrate on the side chain of Thr was determined to be a trisaccharide including sialic acid by a combination of biochemical and synthetic approaches[2]. Antiproliferative factor sialoglycopeptide exerts the following disease-related activities: **i)** inhibition of normal bladder epithelial cell growth, **ii)** inhibition of ^{3}H-thymidine incorporation into the same cell, and **iii)** decrease of heparin-binding epidermal growth factor (EGF)-like growth factor production, and **iv)** increase of EGF production. In addition to these, this glycopeptide inhibits a bladder carcinoma T24 cell proliferation. The peptide without the carbohydrate moiety was found to be inactive, strongly indicating that the carbohydrate attachment onto this peptide is critical for eliciting the activity.

1) S.K. Keay, C.-O. Zhang, J. Shoenfelt, D.R. Erickson, K. Whitmore, J.W. Warren, R. Marvel, and T. Chai, *Urology*, **57**, 9 (2001). (*Original; Antiproliferative Factor Sialoglycopeptide from Urine of Interstitial Cystitis Patients*)
2) S.K. Keay, Z. Szekely, T.P. Conrads, T.D. Veenstra, J.J. Barchi, Jr., C.-O. Zhang, K.R. Koch, and C.J. Michejda, *Proc. Natl. Acad. Sci. U.S.A.*, **101**, 11803 (2004). (*Original; Structure & Pharmacol.*)
3) C.-O. Zhang, Z.-L. Li, and C.-Z. Kong, *BioMed Central Urology* 2005, **5**:7 (article 7 from volume 5 of the journal issued in 2005). (*Pharmacol.*)

****** Other Carbohydrate Related Products ******

Code	Compound			Price:Yen
4031-v -20℃	**Adjuvant Peptide** *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]	Vial	0.5 mg	3,500
4031 -20℃	**Adjuvant Peptide** *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]	Bulk	25 mg	70,000

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)*

4082-v -20℃	**Phosphoramidon** (Sodium Salt) *N*-(α-Rhamnopyranosyloxyhydroxyphosphinyl)-L-leucyl-L-tryptophan (M.W. 543.50) $C_{23}H_{34}N_3O_{10}P$ [36357-77-4] Microbial Product	Vial	0.5 mg	3,500
4082 -20℃	**Phosphoramidon** *N*-(α-Rhamnopyranosyloxyhydroxyphosphinyl)-L-leucyl-L-tryptophan disodium salt dihydrate (M.W. 541.49 • 45.98 • 36.03) $C_{23}H_{32}N_3O_{10}P$ • 2Na • $2H_2O$ [119942-99-3] Microbial Product	Bulk	25 mg 100 mg	14,400 48,500

Inhibitor for Thermolysin, Neutral Endopeptidase-24.11(ANP Degradation Enzyme), and Endothelin Converting Enzyme

1) H. Suda, T. Aoyagi, T. Takeuchi, and H. Umezawa, *J. Antibiotics*, **26**, 621 (1973). (*Original*)
2) S.L. Stephenson and A.J. Kenny, *Biochem. J.*, **243**, 183 (1987). (*Pharmacol.*)
3) B.P. Roques and A. Beaumont, *Trends Pharmacol. Sci.*, **11**, 245 (1990). (*Review*)
4) Y. Matsumura, K. Hisaki, M. Takaoka, and S. Morimoto, *Eur. J. Pharmacol.*, **185**, 103 (1990). (*Pharmacol.*)

- This compound is distributed through Peptide Institute, Inc. under the technical and scientific advices of Microbial Chemistry Research Foundation.