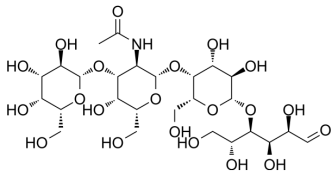
Gangliotetraose

Cat. No.:	HY-N10512
CAS No.:	75645-24-8
Molecular Formula:	$C_{26}H_{45}NO_{21}$
Molecular Weight:	707.63
Target:	Others
Pathway:	Others
Storage:	Please store the product under the recommended conditions in the Certificate of Analysis.



BIOLOGICAL ACTIVITY

Description	Gangliotetraose (Gg4) is a tetrasccharide, exhibits major components including GM1 and its sialylated derivatives. GM1 facilitates efflux of nuclear Ca^{2+} and reduces the level of nuclear Ca^{2+} that characterizes the differentiated neuron. GM1 affects neuronal plasticity and repair mechanisms, as well as neurotrophin release in the brain[1][2].
IC_{50} & Target	Akt, ERK1/2[3]; amyloid β-protein[4]

In Vitro

Gangliotetraose (GM1) (10 μM; 1 h) increases the viability of pheochromocytoma PC12 cells exposed to hydrogen peroxide (1 mM; 2 h) and diminishes the accumulation of reactive oxygen species and oxidative inactivation of Na^+, K^+-ATPase[3].
Gangliotetraose (GM1) (100 nM and 10 μM;) increases the basal activity of Akt and ERK1/2, without changing Akt activity in PC12 cells exposed to hydrogen peroxide[3].
Gangliotetraose (GM1) (50 μM; 24 h) binds the midportion of Aβ to produce Aβ oligomers, GM1 bound Aβ (GAβ). GAβ is endogenously generated in the brain and accelerates Aβ assembly by acting as a seed[4].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[3]

Cell Line:	Rat pheochromocytoma PC12 cells
Concentration:	1 nM, 10 nM, 100 nM, 1 μM, 10 μM, 50 μM
Incubation Time:	1 hour (preincubation); started 24 h after the transfer of the cells to the plates; exposed to 1 mM H_2O_2 for 2 h later
Result:	Showed protective effect (rescue rates, %) on PC12 cells exposed to H_2O_2 in a dose-dependent manner. The rescue rates ranged from 2.7% to 76% with concentration of 1 nM-50 μM.

In Vivo

Gangliotetraose (GM1) (30 mg/kg; i.p.; 5, 11, 42, and 73 d) stimulates the regeneration of nigrostriatal dopaminergic neurons in the central nervous system of rats after unilateral hemitransection[5].

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Animal Model:	Unilateral semi-transection model in Sprague-Dawley rats (170-190 g)[5]
Dosage:	5 mg/kg; 30 mg/kg

Administration:	Intraperitoneal injection; 5, 11, 42, 73 days; started on day 2 after surgery and finished 24 h before sacrifice
Result:	Increased the V_{max} of tyrosine hydroxylase (TH) in the lesioned side starting on day 14 dose-dependently with 73% (5 mg/kg/d) and 85% (30 mg/kg/d) of that of the unlesioned side, respectively.

REFERENCES

[1]. Okada H, et al. Complement-mediated cytolysis and azidothymidine are synergistic in HIV-1 suppression. Int Immunol. 1998 Jan;10(1):91-5.

[2]. Ledeen RW, et al. The role of GM1 and other gangliosides in neuronal differentiation. Overview and new finding. Ann N Y Acad Sci. 1998 Jun 19;845:161-75.

[3]. Zakharova IO, et al. GM1 ganglioside activates ERK1/2 and Akt downstream of Trk tyrosine kinase and protects PC12 cells against hydrogen peroxide toxicity. Neurochem Res. 2014 Nov;39(11):2262-75.

[4]. Toffano G, et al. GM1 ganglioside stimulates the regeneration of dopaminergic neurons in the central nervous system. Brain Res. 1983 Feb 14;261(1):163-6.

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