

Product Data Sheet

Product Name: Sodium butyrate

Cat. No.: GC15857

Chemical Properties

Cas. No. 156-54-7

Chemical Name sodium;butanoate

SMILES CCCC(=O)[O-].[Na+]

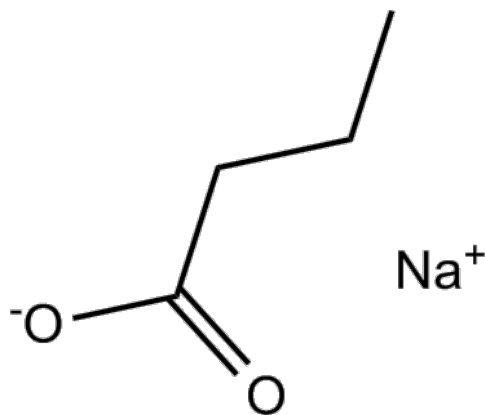
Formula $C_4H_7NaO_2$ M.Wt 110.09

Solubility $\geq 4\text{mg/mL}$ in Water Storage Store at RT

General tips For obtaining a higher solubility, please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution: ship with blue ice All other available size: ship with RT, or blue ice upon request.

Structure



Protocol

Cell experiment [1]:

Cell lines 2 adenoma-derived cell lines (AA/Cl and RG/C2)

Caution: Product has not been fully validated for medical applications. For research use only.

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Preparation method The solubility of this compound in DMSO is limited. General tips for obtaining a higher concentration: Please warm the tube at 37 °C for 10 minutes and/or shake it in the ultrasonic bath for a while. Stock solution can be stored below - 20 °C for several months.

Reacting condition 1 ~ 4 mM; 4 days

Applications In RG/C2 cells, Sodium Butyrate at the concentrations of 2 mM and above reduced the attached-cell yield to approximately 50% of the control, and significantly increased the proportion of floating cells. It was demonstrated that the increase in the percentage of floating cells was attributed to the induction of apoptosis and not simply due to increased necrosis. Compared with RG/C2 cells, AA/CI cells were more sensitive to Sodium Butyrate.

Animal experiment [2]:

Animal models An R6/2 transgenic mouse model of Huntington's disease (HD)

Dosage form 100, 200, 400, 600, 1200, 5000 and 10,000 mg/kg; i.p.; q.d.

Applications In an R6/2 transgenic mouse model of HD, Sodium Butyrate significantly extended survival in a dose-dependent manner, improved body weight and motor performance, as well as delayed the neuropathological sequelae. Moreover, Sodium Butyrate increased the level of histone and specificity protein-1 acetylation, and protected against 3-nitropropionic acid-induced neurotoxicity.

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Other notes Please test the solubility of all compounds indoor, and the actual solubility may slightly differ with the theoretical value. This is caused by an experimental system error and it is normal.

References:

- [1]. Hague A1, Manning AM, Hanlon KA, Huschtscha LI, Hart D, Paraskeva C. Sodium butyrate induces apoptosis in human colonic tumour cell lines in a p53-independent pathway: implications for the possible role of dietary fibre in the prevention of large-bowel cancer. *Int J Cancer*. 1993 Sep 30;55(3):498-505.
- [2]. Ferrante RJ1, Kubilus JK, Lee J, Ryu H, Beesen A, Zucker B, Smith K, Kowall NW, Ratan RR, Luthi-Carter R, Hersch SM. Histone deacetylase inhibition by sodium butyrate chemotherapy ameliorates the neurodegenerative phenotype in Huntington's disease mice. *J Neurosci*. 2003 Oct 15;23(28):9418-27.

Background

Sodium butyrate is a short chain fatty acid that has effects at the molecular, cellular, and tissue level. It has long been known as an inhibitor of histone deacetylases (HDACs).[1],[2] In cells, this alters the expression of a select group of genes containing butyrate response elements and may also involve Sp1/Sp3 binding sites.[3] Sodium butyrate also induces growth arrest, differentiation and apoptosis in cancer cells, primarily through its effects on HDAC activity.[4] In addition, it suppresses inflammation, in part by reducing the expression of pro-inflammatory cytokines, including interferon- γ , interleukin (IL)-6, and IL-1 β . [5]

Reference:

- [1]. Boffa, L.C., Vidali, G., Mann, R.S., et al. Suppression of histone deacetylation in vivo and in vitro by sodium butyrate. *The Journal of Biological Chemistry* 253(10), 3364-3366 (1978).
- [2]. Sealy, L., and Chalkley, R. The effect of sodium butyrate on histone modification. *Cell* 14, 115-121 (1978).
- [3]. Davie, J.R. Inhibition of histone deacetylase activity by butyrate. *Journal of Nutrition* 133, 2485-2493 (2003).

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[4]. Monneret, C. Inhibition of histone deacetylase activity by butyrate. European Journal of Medicinal Chemistry 40, 1-13 (2005).

[5]. Joseph, J., Mudduluru, G., Antony, S., et al. Expression profiling of sodium butyrate (NaB)-treated cells: identification of regulation of genes related to cytokine signaling and cancer metastasis by NaB. Oncogene 23, 6304-6315 (2004).

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