

Small Molecules

Valproic Acid

Epigenetic modifier; Inhibits histone deacetylase (HDAC)1

Catalog # 72292

500 mg



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Product Description

Valproic Acid (VPA) is a short-chain fatty acid that acts as an epigenetic modifier by inhibiting histone deacetylases (HDACs) with IC_{50} values ranging from about 0.4 - 3 mM. VPA can also increase γ -aminobutyric acid (GABA) levels via inhibition of succinic semialdehyde dehydrogenase and other enzymes involved in GABA metabolism. Additional effects include depletion of cellular inositol by inhibiting myo-inositol-1-phosphate synthase (Gottlicher et al.; Khan et al.; Phiel et al.; Rosenberg). This product is supplied as a sodium salt of the molecule.

Molecular Name:	Valproic Acid (Sodium Salt)
Alternative Names:	2-Propylvaleric acid; Sodium valproate; VPA
CAS Number:	1069-66-5
Chemical Formula:	$C_8H_{15}O_2 \cdot Na$
Molecular Weight:	166.2 g/mol
Purity:	$\geq 95\%$
Chemical Name:	2-propyl-pentanoic acid, monosodium salt
Structure:	The chemical structure shows a propyl group (CH ₃ CH ₂ CH ₃) attached to the second carbon of a pentanoic acid chain (CH ₃ CH ₂ CH ₂ CH ₂ COOH). The carboxylic acid group is shown as -COOH, and the sodium salt is indicated as -ONa.

Properties

Physical Appearance:	A crystalline solid
Storage:	Product stable at -20°C as supplied. Protect from prolonged exposure to light. For product expiry date, please contact techsupport@stemcell.com .
Solubility:	<ul style="list-style-type: none">· PBS (pH 7.2) ≤ 60 mM· DMSO ≤ 30 mM· Absolute ethanol ≤ 180 mM <p>For example, to prepare a 10 mM stock solution in PBS, resuspend 100 mg in 60.2 mL of PBS (pH 7.2).</p>

Prepare stock solution fresh before use. Information regarding stability of small molecules in solution has rarely been reported, however, as a general guide we recommend storage in DMSO at -20°C. Aliquot into working volumes to avoid repeated freeze-thaw cycles. The effect of storage of stock solution on compound performance should be tested for each application.

For use as a cell culture supplement, stock solution should be diluted into culture medium immediately before use. Avoid final DMSO concentration above 0.1% due to potential cell toxicity.

Published Applications

MAINTENANCE AND SELF-RENEWAL

- Mediates ex vivo expansion of cord blood CD34+ hematopoietic stem and progenitor cells (Chaurasia et al.).
- Promotes the proliferation and self-renewal of human and mouse hematopoietic progenitor cells (Bug et al., De Felice et al.).

REPROGRAMMING

- Enables chemical reprogramming (without genetic factors) of mouse embryonic fibroblasts to induced pluripotent stem (iPS) cells, in combination with CHIR99021, Forskolin, Tranylcypromine, 3-Deazaneplanocin A, and RepSox (Hou et al.).
- Increases the reprogramming efficiency of mouse embryonic fibroblasts to iPS cells (Huangfu et al. 2008a).
- Promotes reprogramming of human fibroblasts to iPS cells using only 2 factors, OCT4 and SOX2 (Huangfu et al. 2008b).
- Direct lineage reprogramming of fibroblasts to mature neurons, in combination with CHIR99021, RepSox, Forskolin, SP600125, Gö6983 and Y-27632 (Hu et al.).

DIFFERENTIATION

- Promotes differentiation of neurons and suppresses differentiation of astrocytes and oligodendrocytes from rat neural progenitor cells (Hsieh et al., Jung et al.).
- Promotes osteogenic differentiation of human mesenchymal stem cells (Cho et al.).

References

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Göttlicher M et al. (2001) Valproic acid defines a novel class of HDAC inhibitors inducing differentiation of transformed cells. *EMBO J* 20(24): 6969–78.

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Jung G-A et al. (2008) Valproic acid induces differentiation and inhibition of proliferation in neural progenitor cells via the beta-catenin-Ras-ERK-p21Cip/WAF1 pathway. *BMC Cell Biol* 9: 66.

Khan N et al. (2008) Determination of the class and isoform selectivity of small-molecule histone deacetylase inhibitors. *Biochem J* 409(2): 581–9.

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