

## Small Molecules

### Valproic Acid (Sodium Salt)

Epigenetic modifier; Inhibits histone deacetylase (HDAC)1

Catalog # 72292  
100-1053

500 mg  
10 g



Scientists Helping Scientists™ | WWW.STEMCELL.COM

TOLL FREE PHONE 1 800 667 0322 • PHONE +1 604 877 0713

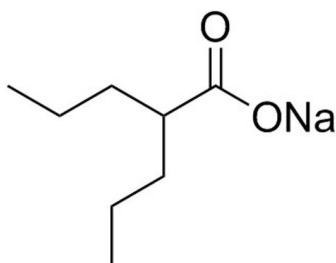
INFO@STEMCELL.COM • TECHSUPPORT@STEMCELL.COM

FOR GLOBAL CONTACT DETAILS VISIT OUR WEBSITE

## 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  $\gamma$ -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:         |   |



## Properties

|                      |   |
|----------------------|---|
| Physical Appearance: | A crystalline solid   |
| Storage:             | Product stable at $-20^{\circ}C$ as supplied. Protect from prolonged exposure to light. Stable as supplied for 12 months from date of receipt.  |
| Solubility:          | <ul style="list-style-type: none"><li>· PBS (pH 7.2) <math>\leq 60</math> mM</li><li>· DMSO <math>\leq 30</math> mM</li><li>· Absolute ethanol <math>\leq 180</math> mM</li></ul> For example, to prepare a 10 mM stock solution in PBS, resuspend 100 mg in 60.2 mL of PBS (pH 7.2). |

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  $-20^{\circ}C$ . 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 (Catalog 372052), Forskolin (Catalog #72112), Tranylcypromine (Catalog #72272), 3-Deazaneplanocin A (Catalog #72322), and RepSox (Catalog #73792) (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 (Catalog #72642), Gö6983 (Catalog #72462), and Y-27632 (Catalog #72302) (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

- Bug G et al. (2005) Valproic acid stimulates proliferation and self-renewal of hematopoietic stem cells. *Cancer Res* 65(7): 2537–41. Chaurasia P et al. (2014) Epigenetic reprogramming induces the expansion of cord blood stem cells. *J Clin Invest* 124(6): 2378–95. Cho HH et al. (2005) Induction of osteogenic differentiation of human mesenchymal stem cells by histone deacetylase inhibitors. *J Cell Biochem* 96(3): 533–42. De Felice L et al. (2005) Histone deacetylase inhibitor valproic acid enhances the cytokine-induced expansion of human hematopoietic stem cells. *Cancer Res* 65(4): 1505–13. 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. Hou P et al. (2013) Pluripotent stem cells induced from mouse somatic cells by small-molecule compounds. *Science* 341(6146): 651–4. Hsieh J et al. (2004) Histone deacetylase inhibition-mediated neuronal differentiation of multipotent adult neural progenitor cells. *Proc Natl Acad Sci USA* 101(47): 16659–64. Hu W et al. (2015) Direct conversion of normal and Alzheimer's Disease human fibroblasts into neuronal cells by small molecules. *Cell Stem Cell* 17(2): 204–212. Huangfu D et al. (2008a) Induction of pluripotent stem cells by defined factors is greatly improved by small-molecule compounds. *Nat Biotechnol* 26(7): 795–797. Huangfu D et al. (2008b) Induction of pluripotent stem cells from primary human fibroblasts with only Oct4 and Sox2. *Nat Biotechnol* 26(11): 1269–1275. 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. Phiel CJ et al. (2001) Histone deacetylase is a direct target of valproic acid, a potent anticonvulsant, mood stabilizer, and teratogen. *J Biol Chem* 276(39): 36734–41. Rosenberg G. (2007) The mechanisms of action of valproate in neuropsychiatric disorders: can we see the forest for the trees? *Cell Mol Life Sci* 64(16): 2090–103.

## Related Small Molecules

For a complete list of small molecules available from STEMCELL Technologies, visit [www.stemcell.com/smallmolecules](http://www.stemcell.com/smallmolecules) or contact us at [techsupport@stemcell.com](mailto:techsupport@stemcell.com).

**This product is hazardous. Please refer to the Safety Data Sheet (SDS).**

PRODUCTS ARE FOR RESEARCH USE ONLY AND NOT INTENDED FOR HUMAN OR ANIMAL DIAGNOSTIC OR THERAPEUTIC USES UNLESS OTHERWISE STATED.

Copyright © 2022 by STEMCELL Technologies Inc. All rights reserved including graphics and images. STEMCELL Technologies & Design, STEMCELL Shield Design, and Scientists Helping Scientists are trademarks of STEMCELL Technologies Canada Inc. All other trademarks are the property of their respective holders. While STEMCELL has made all reasonable efforts to ensure that the information provided by STEMCELL and its suppliers is correct, it makes no warranties or representations as to the accuracy or completeness of such information.