Small Molecules

Forskolin

cAMP pathway activator; Activates adenylyl cyclase

Catalog #	72112	1 mg
	72114	10 mg
	100-0249	25 mg

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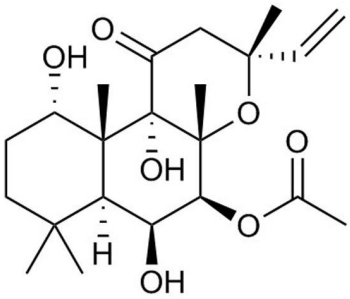
Product Description

Forskolin is a cell-permeable diterpene that directly activates adenylyl cyclase (IC_{50} = 41 nM), which is the enzyme that produces cyclic adenosine monophosphate (cAMP), to raise cAMP levels in the cell. cAMP is an important second messenger involved in many signal transduction pathways, including activation of protein kinase A (PKA; Awad et al.; Robbins et al.).

Molecular Name:	Forskolin
Alternative Names:	Coleonol; HL 362; L 75-1362B; NSC 357088; NSC 375489
CAS Number:	66575-29-9
Chemical Formula:	$C_{22}H_{34}O_7$
Molecular Weight:	410.5 g/mol
Purity:	≥ 98%
Chemical Name:	5-(acetyloxy)-3-ethenyldodecahydro-6,10,10b-trihydroxy-3,4a,7,7,10a-pentamethyl-(3R,4aR,5S,6S,6aS,10S,10aR,10bS)-1H-Naphtho[2,1-b]pyran-1-one
Structure:	

Properties

Physical Appearance:	A crystalline solid
Storage:	Product stable at -20°C as supplied. Protect from prolonged exposure to light. Stable as supplied for 12 months from date of receipt.
Solubility:	· DMSO ≤ 70 mM · Absolute ethanol ≤ 35 mM For example, to prepare a 10 mM stock solution in DMSO, resuspend 1 mg in 244 µL of fresh DMSO. 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. Compound has low solubility in aqueous media. 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

REPROGRAMMING

· Enables chemical reprogramming (without genetic factors) of mouse embryonic fibroblasts to induced pluripotent stem (iPS) cells, in combination with CHIR99021 (Catalog #72052), Tranylcypromine (Catalog #72272), Valproic Acid (Catalog #72292), 3-Deazaneplanocin A (Catalog #72322), and RepSox (Catalog #73792) (Hou et al.).

· Enables NGN2-mediated transdifferentiation of human fibroblasts to cholinergic neurons (Liu et al.).

· Direct lineage reprogramming of fibroblasts to mature neurons, in combination with RepSox, CHIR99021, SP600125 (Catalog #72642), Valproic Acid, Gö6983, and Y-27632 (Catalog #72302) (Hu et al.).

· Direct lineage reprogramming of fibroblasts to mature neurons, in combination with CHIR99021, ISX-9 (Catalog #73202), SB431542 (Catalog #72232), and I-BET151 (Catalog #73712) (Li et al.).

· Converts human embryonic stem (ES) cells in a naïve or ground state similar to mouse ES cells, in combination with LIF (Catalog #78055), FGF2, TGFβ, and small molecules PD0325901 (Catalog #72182), CHIR99021, SP600125, and SB203580 (Catalog #72222) (Hanna et al.).

DIFFERENTIATION

· Potentiates neuronal differentiation of rat hippocampal neural progenitor cells (Hsieh et al.; Palmer et al.).

References

Awad JA et al. (1983) Interactions of forskolin and adenylate cyclase. Effects on substrate kinetics and protection against inactivation by heat and N-ethylmaleimide. J Biol Chem 258(5): 2960–5.

Hanna J et al. (2010) Human embryonic stem cells with biological and epigenetic characteristics similar to those of mouse ESCs. Proc Natl Acad Sci USA 107(20): 9222–7.

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): 204–12.

Li X et al. (2015) Small molecule-driven direct reprogramming of mouse fibroblasts into functional neurons. Cell Stem Cell 17(2): 195–203.

Liu M-L et al. (2013) Small molecules enable neurogenin 2 to efficiently convert human fibroblasts into cholinergic neurons. Nat Commun 4: 2183.

Palmer TD et al. (1997) The adult rat hippocampus contains primordial neural stem cells. Mol Cell Neurosci 8(6): 389–404.

Robbins JD et al. (1996) Forskolin carbamates: binding and activation studies with type I adenylyl cyclase. J Med Chem 39(14): 2745–52.

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