

## Small Molecules

### Forskolin

cAMP pathway activator; Activates adenylyl cyclase

Catalog # 72112  
72114

1 mg  
10 mg



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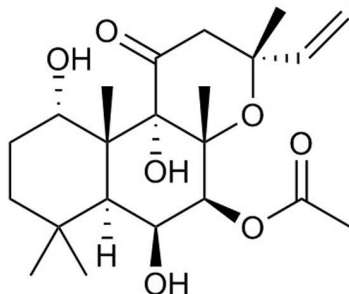
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## Product Description

Forskolin is a cell permeable diterpene that directly activates adenylyl cyclase ( $IC_{50} = 41 \text{ nM}$ ), the enzyme that produces cyclic adenosine monophosphate (cAMP), which as a result raises 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:	$\geq 98\%$
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 $-20^{\circ}\text{C}$ as supplied. Protect from prolonged exposure to light. For product expiry date, please contact <a href="mailto:techsupport@stemcell.com">techsupport@stemcell.com</a> .
Solubility:	<ul style="list-style-type: none"><li>· DMSO <math>\leq 70 \text{ mM}</math></li><li>· Absolute ethanol <math>\leq 35 \text{ mM}</math></li></ul> For example, to prepare a 10 mM stock solution in DMSO, resuspend 1 mg in 244 $\mu\text{L}$ 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  $-20^{\circ}\text{C}$ . 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, Tranylcypromine, Valproic Acid, 3-Deazaneplanocin A, and RepSox (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, Valproic Acid, Gö6983 and Y-27632 (Hu et al.).
- Direct lineage reprogramming of fibroblasts to mature neurons, in combination with CHIR99021, ISX-9, SB431542, and I-BET151 (Li et al.).
- Converts human embryonic stem (ES) cells in a “naïve” or ground state similar to mouse ES cells, in combination with LIF, FGF2, TGFβ and small molecules PD0325901, CHIR99021, SP600125, and SB203580 (Hanna et al.).

### DIFFERENTIATION

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

## References

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- Hsieh J et al. (2004) Histone deacetylase inhibition-mediated neuronal differentiation of multipotent adult neural progenitor cells. *Proc Natl Acad Sci U S A* 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.
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- 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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