

# Small Molecules

## Dorsomorphin

BMP and AMPK pathway inhibitor;  
Inhibits ALK2, ALK3, ALK6, and AMPK

Catalog # 72102

10 mg



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## Product Description

Dorsomorphin inhibits the bone morphogenetic protein (BMP) pathway by targeting the type I BMP receptors activin receptor-like kinase (ALK) 2, ALK3, and ALK6. It is also a potent inhibitor of AMP-activated protein kinase (AMPK,  $K_i = 109$  nM) but does not significantly inhibit structurally related kinases such as ZAPK, SYK, PKC $\theta$ , PKA or JAK3 (Bain et al.; Yu et al.).

Molecular Name: Dorsomorphin

Alternative Names: Compound C

CAS Number: 866405-64-3

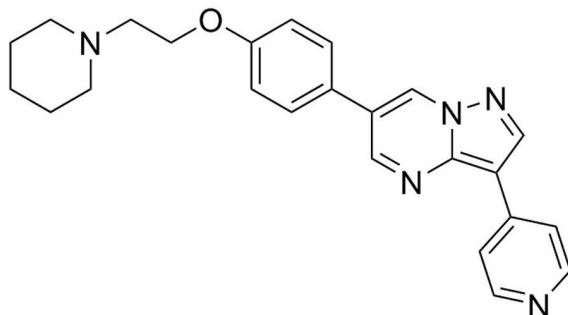
Chemical Formula:  $C_{24}H_{25}N_5O$

Molecular Weight: 399.5 g/mol

Purity:  $\geq 98\%$

Chemical Name: 6-[4-[2-(1-piperidinyl)ethoxy]phenyl]-3-(4-pyridinyl)-pyrazolo[1,5-a]pyrimidine

Structure:



## 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](mailto:techsupport@stemcell.com).

Solubility:

- Absolute ethanol  $\leq 350$   $\mu$ M
- Dimethylformamide (DMF)  $\leq 6.2$  mM

For example, to prepare a 300  $\mu$ M stock solution in absolute ethanol, resuspend 1 mg in 8.3 mL of absolute ethanol.

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 absolute ethanol 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 ethanol concentration above 0.1% due to potential cell toxicity.

## Published Applications

### DIFFERENTIATION

- Promotes differentiation of neural progenitor cells from human pluripotent stem cells (Morizane et al.; Zhou et al.).
- Promotes differentiation of cardiomyocytes from mouse and human pluripotent stem cells (Hao et al.; Kattman et al.).
- Promotes differentiation of adipocytes and suppresses osteogenic differentiation of osteoblasts from human mesenchymal cells (Kim et al.).

## References

Bain J et al. (2007) The selectivity of protein kinase inhibitors: a further update. *Biochem J* 408(3): 297–315.

Hao J et al. (2008) Dorsomorphin, a selective small molecule inhibitor of BMP signaling, promotes cardiomyogenesis in embryonic stem cells. *PLoS One* 3(8): e2904.

Kattman SJ et al. (2011) Stage-specific optimization of activin/nodal and BMP signaling promotes cardiac differentiation of mouse and human pluripotent stem cell lines. *Cell Stem Cell* 8(2): 228–40.

Kim E-K et al. (2012) Human mesenchymal stem cell differentiation to the osteogenic or adipogenic lineage is regulated by AMP-activated protein kinase. *J Cell Physiol* 227(4): 1680–7.

Morizane A et al. (2011) Small-molecule inhibitors of bone morphogenic protein and activin/nodal signals promote highly efficient neural induction from human pluripotent stem cells. *J Neurosci Res* 89(2): 117–126.

Yu PB et al. (2008) Dorsomorphin inhibits BMP signals required for embryogenesis and iron metabolism. *Nat Chem Biol* 4(1): 33–41.

Zhou J et al. (2010) High-efficiency induction of neural conversion in human ESCs and human induced pluripotent stem cells with a single chemical inhibitor of transforming growth factor beta superfamily receptors. *Stem Cells* 28(10): 1741–50.

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