Small Molecules

Purvalanol A

Cyclin/CDK pathway inhibitor; Inhibits CDKs

Catalog # 73772 1 mg
73774 10 mg

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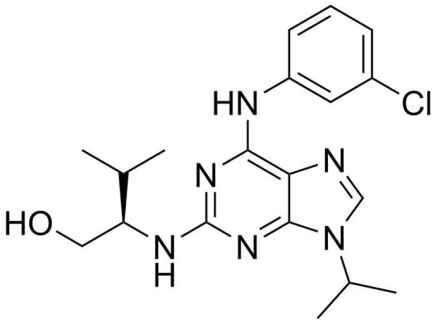
Product Description

Purvalanol A is a cell-permeable, potent, and selective inhibitor of cyclin-dependent kinases (CDKs). CDKs and cyclins form a stoichiometric complex, which is necessary for the CDK subunit to gain its protein kinase activity. It has been shown that these CDK/cyclin complexes play a key role in initiating G2/M transitions of the cell cycle (Jackman & Pines). Purvalanol A acts through competitive inhibition of ATP binding, to inhibit CDK1/cyclin B (IC_{50} = 4 nM), CDK2/cyclin A (IC_{50} = 70 nM), CDK2/cyclin E (IC_{50} = 35 nM), CDK4/cyclin D1 (IC_{50} = 850 nM), and CDK5-p35 (IC_{50} = 75 nM; Bain et al.; Gray et al.), thereby arresting cells in G1 and G2.

Molecular Name:	Purvalanol A
Alternative Names:	NG 60
CAS Number:	212844-53-6
Chemical Formula:	$C_{19}H_{25}ClN_6O$
Molecular Weight:	388.9 g/mol
Purity:	≥ 98%
Chemical Name:	(2R)-2-[[6-[(3-chlorophenyl)amino]-9-(1-methylethyl)-9H-purin-2-yl]amino]-3-methyl-1-butanol
Structure:	

Properties

Physical Appearance:	A crystalline solid
Storage:	Product stable at -20°C as supplied. Protect product from prolonged exposure to light. For long-term storage store with a desiccant. Stable as supplied for 12 months from date of receipt.
Solubility:	· DMSO ≤ 75 mM · Absolute ethanol ≤ 25 mM For example, to prepare a 10 mM stock solution in DMSO, resuspend 1 mg in 257 µL of 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

CANCER RESEARCH
· Inhibits proliferation in exponentially growing cancer cell lines and reversibly arrests synchronised cells in G1 and G2 phase of cell cycle (Villerbu et al.).
· Induces apoptosis in MCF-7 estrogen receptor positive breast cancer cells (Obakan et al.).
· Suppresses cancer progression associated with Src up-regulation by the coordinated inhibition of cell cycle progression and tyrosine kinase signaling (Hikita et al.).

References

Bain J et al. (2003) The specificities of protein kinase inhibitors: an update. Biochem J 371(Pt 1): 199–204.
Gray NS et al. (1998) Exploiting chemical libraries, structure, and genomics in the search for kinase inhibitors. Science 281(5376): 533–8.
Hikita T et al. (2010) Purvalanol A, a CDK inhibitor, effectively suppresses Src-mediated transformation by inhibiting both CDKs and c-Src. Genes Cells 15(10): 1051–62.
Jackman MR & Pines JN. (1997) Cyclins and the G2/M transition. Cancer Surv 29: 47–73.
Obakan P et al. (2014) Purvalanol A is a strong apoptotic inducer via activating polyamine catabolic pathway in MCF-7 estrogen receptor positive breast cancer cells. Mol Biol Rep 41(1): 145–54.
Villerbu N et al. (2002) Cellular effects of purvalanol A: a specific inhibitor of cyclin-dependent kinase activities. Int J Cancer 97(6): 761–9.

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