Small Molecules

Paclitaxel

Inhibitor of microtubule formation

Catalog #	73312	25 mg
	73314	100 mg

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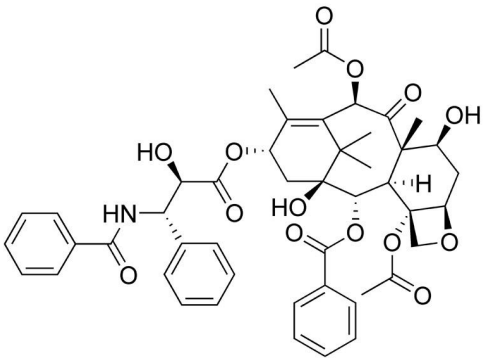
Product Description

Paclitaxel is a diterpene alkaloid originally isolated from the bark of the Pacific Yew tree (Taxus brevifolia). It binds to and stabilizes microtubules, preventing their reorganization during cell division, which leads to cell cycle arrest. Paclitaxel has antitumorigenic properties and has been used as a chemotherapeutic compound (Rowinsky et al.). Many pathways have been implicated in Paclitaxel-induced apoptosis, including c-Jun N-terminal kinase/stress-activated protein kinase (JNK/SAPK), p38 mitogen-activated protein kinase (MAPK), and protein kinase A (PKA) (Reshkin et al.; Wang et al.).

Molecular Name:	Paclitaxel
Alternative Names:	NSC 125973
CAS Number:	33069-62-4
Chemical Formula:	$C_{47}H_{51}NO_{14}$
Molecular Weight:	853.9 g/mol
Purity:	≥ 98%
Chemical Name:	(2aR,4S,4aS,6R,9S,11S,12S,12aR,12bS)-1,2a,3,4,4a,6,9,10,11,12,12a,12b-Dodecahydro-4,6,9,11,12,12b-hexahydroxy-4a,8,13,13-tetramethyl-7,11-methano-5H-cyclodeca(3,4)benz(1,2-b)oxet-5-one 6,12b-diacetate, 12-benzoate, 9-ester with (2R,3S)-N-benzoyl-3-phenylisoserine
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 ≤ 5 mM · Absolute ethanol ≤ 1.5 mM For example, to prepare a 1 mM stock solution in DMSO, resuspend 10 mg in 11.7 mL 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

DIFFERENTIATION
· Inhibits initiation and outgrowth of neurites in vitro, through microtubule polymerization (Letourneau & Ressler).
CANCER RESEARCH
· Inhibits tumor cell growth in a variety of cancer cell lines including cervical (HeLa), lung (A549), breast (MCF-7), colon (HT-29), ovarian (OVG-1), and pancreatic (PC-Sh) carcinomas (Liebmann et al.).
· Induces abnormal multipolar spindle formation, inducing cell cycle arrest at prophase and G1 in various human cell cancer lines (Woods et al.).
· Initiates apoptosis of cancer cells through multiple mechanisms involving: p53-dependent and -independent pathways, B cell CLL/lymphoma 2 (BCL-2) family members, cyclin-dependent kinases, p38 MAPK, PKA, and JNK/SAPK (Reshkin et al.; Wang et al.).
· Induces cyclin inhibitor p21 in MCF7 and PC3M human cancer cell lines by a mechanism dependent on the activation of RAF-1 (Blagosklonny et al.).

References

Blagosklonny M V et al. (1995) Taxol induction of p21WAF1 and p53 requires c-raf-1. Cancer Res 55(20): 4623–6.
Letourneau PC & Ressler AH. (1984) Inhibition of neurite initiation and growth by taxol. J Cell Biol 98(4): 1355–62.
Liebmann JE et al. (1993) Cytotoxic studies of paclitaxel (Taxol) in human tumour cell lines. Br J Cancer 68(6): 1104–9.
Reshkin SJ et al. (2003) Paclitaxel induces apoptosis via protein kinase A- and p38 mitogen-activated protein-dependent inhibition of the Na+/H+ exchanger (NHE) NHE isoform 1 in human breast cancer cells. Clin Cancer Res 9(6): 2366–73.
Rowinsky EK et al. (1990) Taxol: a novel investigational antimicrotubule agent. J Natl Cancer Inst 82(15): 1247–59.
Wang TH et al. (2000) Paclitaxel-induced cell death: where the cell cycle and apoptosis come together. Cancer 88(11): 2619–28.
Woods CM et al. (1995) Taxol-induced mitotic block triggers rapid onset of a p53-independent apoptotic pathway. Mol Med 1(5): 506–26.

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