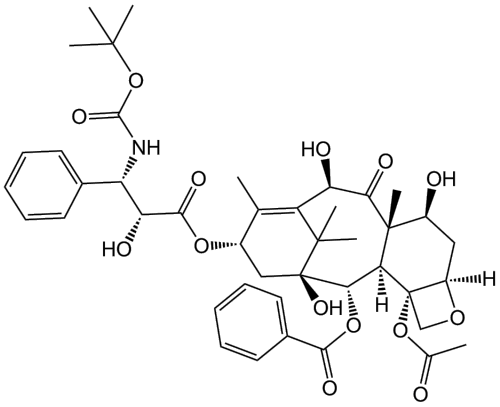
Product Data Sheet

Product Name: Docetaxel
Cat. No.: GC16684

Chemical Properties

Cas. No.	114977-28-5		
SMILES	O=C(N[C@H]([C@H](C(O[C@H]1C[C@]2(O)C(C)(C)C([C@@H](O)C([C@@]3(C)[C@]([C@@](CO4)(OC(C)=O)[C@@]4([H])C[C@@H]3O)([H])[C@@H]2OC(C5=CC=CC=C5)=O)=O)=C1C)=O)O)C6=CC=CC=C6)OC(C)(C)C		
Formula	$C_{43}H_{53}NO_{14}$	M.Wt	807.88
Solubility	≥ 40.4mg/mL in DMSO, ≥ 94.4 mg/mL in EtOH	Storage	4°C, protect from light
General tips	For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20°C for several months.		
Shipping Condition	Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.		

Structure



Protocol

Cell experiment [1]:

Cell lines PC-3M IE8 cells

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Preparation Method	PC-3M IE8 cells were digested and reseeded in a 96-well plate, and treated with Docetaxel. The cell viability of cells was determined by CCK-8 assay.
Reaction Conditions	5 uM; 24-72h
Applications	Docetaxel suppressed cell proliferation.

Animal experiment [2]:

Animal models	5 weeks old male C57BL/6J mice (Subcutaneous anti-castrated prostate cancer mouse model)
Preparation Method	Mice were inoculated with RM1 cells, and on day 7, mice carrying RM1 cells were castrated bilaterally under anesthesia. When the subcutaneous tumor volume reached the standard, the mice were randomly divided into 4 groups, which were respectively given intrabitoneal administration (DMSO, anti-PD1, bicalutamide and docetaxel), and the tumor volume was measured every 3 days.
Dosage form	10 mg/kg Docetaxel per injection；i.p; once per week for two consecutive weeks
Applications	Docetaxel inhibits tumor development.

Caution: Product has not been fully validated for medical applications. For research use only.
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References:

[1]. Peng J, He Z, et,al. Docetaxel suppressed cell proliferation through Smad3/HIF-1α-mediated glycolysis in prostate cancer cells. Cell Commun Signal. 2022 Dec 19;20(1):194. doi: 10.1186/s12964-022-00950-z. PMID: 36536346; PMCID: PMC9762006.
[2].Ma Z, Zhang W, et,al. Docetaxel remodels prostate cancer immune microenvironment and enhances checkpoint inhibitor-based immunotherapy. Theranostics. 2022 Jun 27;12(11):4965-4979. doi: 10.7150/thno.73152. PMID: 35836810; PMCID: PMC9274752.

Background

Docetaxel is a taxane class of anti-mitotic chemotherapeutic agents with an IC50 of 0.2 μM. It preferentially binds to β-tubulin, suppresses microtubule dynamics, disrupts cell division, and therefore effectively induces apoptosis. Docetaxel has anti-cancer activity[1-3].

Docetaxel(5 uM;24-72h) suppressed PC-3M IE8 cell proliferation and aerobic glycolysis[4]. Docetaxel(50 nM; 12-48 h) inhibited the proliferation while it enhanced the apoptosis of human CD133 expressing HCC stem cells[5]. Docetaxel treatment activates lysosomal function and promotes its fusion with autophagosome[6].

Docetaxel-based(10 mg/kg Docetaxel per injection；i.p; once per week for two consecutive weeks) chemohormonal therapy prompted the intratumoral infiltration of T cells and upregulated the abundance of PD1 and PD-L1, thereby sensitizing mouse tumors to the anti-PD1 blockade in a xenograft mouse model[7-8].

References:
[1]. James ND, Sydes MR, et,al. Addition of docetaxel, zoledronic acid, or both to first-line long-term hormone therapy in prostate cancer (STAMPEDE): survival results from an adaptive, multiarm, multistage, platform randomised controlled trial. Lancet. 2016 Mar 19;387(10024):1163-77. doi: 10.1016/S0140-6736(15)01037-5. Epub 2015 Dec 21. PMID: 26719232; PMCID: PMC4800035.
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[3]. Buey RM, DÍaz JF, et,al. Interaction of epothilone analogs with the paclitaxel binding site: relationship between binding affinity, microtubule stabilization, and cytotoxicity. Chem Biol. 2004

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Feb;11(2):225-36. doi: 10.1016/j.chembiol.2004.01.014. PMID: 15123284.
[4]. Peng J, He Z, et,al. Docetaxel suppressed cell proliferation through Smad3/HIF-1α-mediated glycolysis in prostate cancer cells. Cell Commun Signal. 2022 Dec 19;20(1):194. doi: 10.1186/s12964-022-00950-z. PMID: 36536346; PMCID: PMC9762006.
[5]. Zhang X, Shao J, et,al. Docetaxel promotes cell apoptosis and decreases SOX2 expression in CD133-expressing hepatocellular carcinoma stem cells by suppressing the PI3K/AKT signaling pathway. Oncol Rep. 2019 Feb;41(2):1067-1074. doi: 10.3892/or.2018.6891. Epub 2018 Nov 27. PMID: 30483804.
[6]. Zhang J, Wang J, et,al. Docetaxel enhances lysosomal function through TFEB activation. Cell Death Dis. 2018 May 23;9(6):614. doi: 10.1038/s41419-018-0571-4. PMID: 29795139; PMCID: PMC5966422.
[7]. Ma Z, Zhang W, et,al. Docetaxel remodels prostate cancer immune microenvironment and enhances checkpoint inhibitor-based immunotherapy. Theranostics. 2022 Jun 27;12(11):4965-4979. doi: 10.7150/thno.73152. PMID: 35836810; PMCID: PMC9274752.
[8]. Yu Y, Yang FH, et,al. Mesenchymal stem cells desensitize castration-resistant prostate cancer to docetaxel chemotherapy via inducing TGF-beta1-mediated cell autophagy. Cell Biosci. 2021;11(1):7.

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