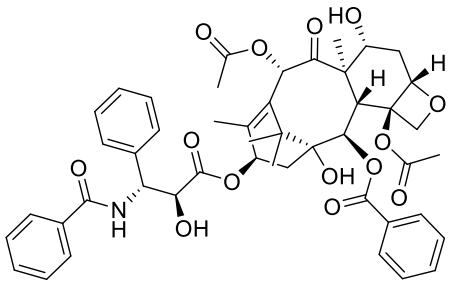
Product data sheet

MedKoo Cat#: 100690 Name: Paclitaxel CAS#: 33069-62-4 Chemical Formula: $C_{47}H_{51}NO_{14}$ Exact Mass: 853.33096 Molecular Weight: 853.91	
Product supplied as:	Powder
Purity (by HPLC):	≥ 98%
Shipping conditions	Ambient temperature
Storage conditions:	Powder: -20°C 3 years; 4°C 2 years.
	In solvent: -80°C 3 months; -20°C 2 weeks.

1. Product description:
Paclitaxel is a compound with antineoplastic activity extracted from the Pacific yew tree Taxus brevifolia. Paclitaxel binds to tubulin and inhibits the disassembly of microtubules, thereby inhibiting cell division. This agent also induces apoptosis by binding to and blocking the function of the apoptosis inhibitor protein Bcl-2 (B-cell Leukemia 2).

2. CoA, QC data, SDS, and handling instruction
SDS and handling instruction, CoA with copies of QC data (NMR, HPLC and MS analytical spectra) can be downloaded from the product web page under "QC And Documents" section. Note: copies of analytical spectra may not be available if the product is being supplied by MedKoo partners. Whether the product was made by MedKoo or provided by its partners, the quality is 100% guaranteed.

3. Solubility data

Solvent	Max Conc. mg/mL	Max Conc. mM
Cloroform	1.0	1.17
DMF	5.0	5.86
DMSO	77.85	91.17
DMSO:PBS (pH 7.2) (1:10)	0.1	0.12
Ethanol	14.33	16.78
Methanol	5.0	5.86

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	**1 mg**	**5 mg**	**10 mg**
1 mM	1.17 mL	5.86 mL	11.71 mL
5 mM	0.23 mL	1.17 mL	2.34 mL
10 mM	0.12 mL	0.59 mL	1.17 mL
50 mM	0.02 mL	0.12 mL	0.23 mL

5. Molarity Calculator, Reconstitution Calculator, Dilution Calculator
Please refer the product web page under section of "Calculator"

6. Recommended literature which reported protocols for in vitro and in vivo study

In vitro study

1. Wang L, Liu C, Qiao F, Li M, Xin H, Chen N, Wu Y, Liu J. Analysis of the cytotoxic effects, cellular uptake and cellular distribution of paclitaxel-loaded nanoparticles in glioblastoma cells in vitro. Exp Ther Med. 2021 Apr;21(4):292. doi: 10.3892/etm.2021.9723. Epub 2021 Jan 27. PMID: 33717235; PMCID: PMC7885080.
2. Yang X, Qin J, Gong C, Yang J. Propofol enhanced the cell sensitivity to paclitaxel (PTX) in prostatic cancer (PC) through modulation of HOTAIR. Genes Genomics. 2021 Apr 23. doi: 10.1007/s13258-021-01093-0. Epub ahead of print. PMID: 33893626.

In vivo study

1. Varan G, Varan C, Öztürk SC, Benito JM, Esendağlı G, Bilensoy E. Therapeutic Efficacy and Biodistribution of Paclitaxel-Bound Amphiphilic Cyclodextrin Nanoparticles: Analyses in 3D Tumor Culture and Tumor-Bearing Animals In Vivo. Nanomaterials (Basel). 2021 Feb 18;11(2):515. doi: 10.3390/nano11020515. PMID: 33670527; PMCID: PMC7922126.

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2. Gui G, Fan Z, Ning Y, Yuan C, Zhang B, Xu Q. Optimization, Characterization and in vivo Evaluation of Paclitaxel-Loaded Folate-Conjugated Superparamagnetic Iron Oxide Nanoparticles. Int J Nanomedicine. 2021 Mar 19;16:2283-2295. doi: 10.2147/IJN.S287434. PMID: 33776433; PMCID: PMC7992116.

7. Bioactivity

Biological target:

Antineoplastic agent that stabilizes tubulin polymerization.

In vitro activity

PTX (Paclitaxel) or PTX-Tf-NPs (Paclitaxel transferrin nanoparticles) reduce the viability of rat glioblastoma C6 cells in a dose-dependent manner, but PTX-Tf-NPs exhibit a stronger inhibitory effect at higher concentrations compared with PTX. Rat glioblastoma C6 cells were treated with Tf-NPs, PTX or PTX-Tf-NPs for 48 h, and cell viability was detected using the MTT assay. The percentages of cell viability are presented in Fig. 1 and Table I. The results indicated that treatment with Tf-NPs at concentrations of 0.0032 or 0.016 µg/ml did not inhibit C6 cell viability, whereas Tf-NP treatment at concentrations of 0.08, 0.4, 2 and 10 µg/ml resulted in a cell viability of 92, 97, 97 and 88% in C6 cells, respectively, compared with control cells, indicating that Tf-NPs alone cause a low cytotoxicity in C6 cells. Both PTX and PTX-Tf-NPs exhibited a dose-dependent effect on cell viability in C6 cells. Following PTX treatment at concentrations of 0.0032, 0.016 and 0.08 µg/ml, C6 cell viability was 91, 87 and 83%, respectively, while following PTX-Tf-NP treatment, cell viability was 95, 91 and 83%, respectively. Statistical analysis revealed that at a concentration of ≤0.08 µg/ml, no significant difference in cell viability by treatment with either PTX or PTX-Tf-NPs was observed, indicating that PTX and PTX-Tf-NPs exhibit similar cell viability inhibitory effects at these concentrations. Nevertheless, at concentrations of 0.4, 2 and 10 µg/ml, C6 cells treated with PTX exhibited an average viability of 81, 74 and 62%, respectively, but C6 cells treated with PTX-Tf-NPs exhibited significantly lower viability compared with cells treated with PTX (78, 69 and 56%, respectively). This suggested that PTX-Tf-NPs were more potent compared with PTX in reducing the viability of C6 glioblastoma cells at higher concentrations.

Reference: Exp Ther Med. 2021 Apr; 21(4): 292. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7885080/

In vivo activity

The blank and the PCX(Paclitxel)-loaded CD nanoparticles were administered to the tumor-bearing mice, and the change in tumor size was followed for 14 days (Figure 8 and Figure 9). On day 5, compared to the control groups that received physiological saline or blank CD nanoparticles, an approximately 25% reduction was observed in the tumor size of the mice treated with PCX-loaded nanoparticle or PCX solution (Figure 8). The most significant difference between the groups was achieved on day 8 in which the tumors continued to grow in the physiological saline control group; on the other hand, either the blank or the PCX-loaded CD nanoparticles reduced the tumor burden. In general, the PCX-loaded positively charged nanoparticles were the most efficient antitumor formulation, albeit not reaching the level of statistical significance (Figure 8). On day 14, the tumor size was reduced by 50% in all groups that were treated with blank or PCX-loaded CD formulations, or PCX solution. Collectively, the antitumor effect of the PCX-loaded amphiphilic CD nanoparticles was observed earlier than the PCX solution. Interestingly, in the long run, the blank CD nanoparticles were also capable of hindering the tumor growth (Figure 8 and Figure 9). Accordingly, Erdogar et al. showed that folate-targeted CD nanoparticles were better tolerated by animals and localized in the tumor area than PCX solution in Cremophor®EL. These results support that the CD nanoparticles can be a good candidate for increasing the efficacy and safety of PCX therapy in breast cancer.

Reference: Nanomaterials (Basel). 2021 Feb; 11(2): 515. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7922126/