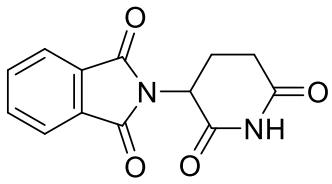
Product data sheet

MedKoo Cat#: 100840 Name: Thalidomide CAS#: 50-35-1 Chemical Formula: $C_{13}H_{10}N_2O_4$ Exact Mass: 258.06406 Molecular Weight: 258.23	
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:

Thalidomide is a synthetic derivative of glutamic acid (alpha-phthalimido-glutarimide) with teratogenic, immunomodulatory, anti-inflammatory and anti-angiogenic properties. Thalidomide acts primarily by inhibiting both the production of tumor necrosis factor alpha (TNF-alpha) in stimulated peripheral monocytes and the activities of interleukins and interferons. This agent also inhibits polymorphonuclear chemotaxis and monocyte phagocytosis. In addition, thalidomide inhibits pro-angiogenic factors such as vascular endothelial growth factor (VEGF) and basic fibroblast growth factor (bFGF), thereby inhibiting angiogenesis.

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
DMSO	33.0	127.79
DMSO:PBS (pH 7.2) (1:8)	0.11	0.43
DMF	12.0	46.47

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	1 mg	5 mg	10 mg
1 mM	3.87 mL	19.36 mL	38.73 mL
5 mM	0.77 mL	3.87 mL	7.75 mL
10 mM	0.39 mL	1.94 mL	3.87 mL
50 mM	0.08 mL	0.39 mL	0.77 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. Shimizu M, Tachikawa S, Saitoh N, Nakazono K, Yu-Jung L, Suga M, Ohnuma K. Thalidomide affects limb formation and multiple myeloma related genes in human induced pluripotent stem cells and their mesoderm differentiation. Biochem Biophys Rep. 2021 Mar 13;26:100978. doi: 10.1016/j.bbrep.2021.100978. PMID: 33763605; PMCID: PMC7973312.
2. Liao H, Li Y, Zhang X, Zhao X, Zheng D, Shen D, Li R. Protective Effects of Thalidomide on High-Glucose-Induced Podocyte Injury through In Vitro Modulation of Macrophage M1/M2 Differentiation. J Immunol Res. 2020 Aug 27;2020:8263598. doi: 10.1155/2020/8263598. PMID: 32908940; PMCID: PMC7474395.

In vivo study

1. Tang CT, Zhang QW, Wu S, Tang MY, Liang Q, Lin XL, Gao YJ, Ge ZZ. Thalidomide targets EGFL6 to inhibit EGFL6/PAX6 axis-driven angiogenesis in small bowel vascular malformation. Cell Mol Life Sci. 2020 Dec;77(24):5207-5221. doi: 10.1007/s00018-020-03465-3. Epub 2020 Feb 1. PMID: 32008086; PMCID: PMC7671996.

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2. Chen LX, Ni XL, Zhang H, Wu M, Liu J, Xu S, Yang LL, Fu SZ, Wu J. Preparation, characterization, in vitro and in vivo anti-tumor effect of thalidomide nanoparticles on lung cancer. Int J Nanomedicine. 2018 Apr 23;13:2463-2476. doi: 10.2147/IJN.S159327. PMID: 29719394; PMCID: PMC5922239.

7. Bioactivity

Biological target:

Thalidomide-5-OH is the Thalidomide-based cereblon ligand used in the recruitment of CRBN protein.

In vitro activity

Thalidomide upregulated five genes (AICDA, BMP, LEFTY1, LEFTY2, and TBX3) and downregulated one gene (ACTC1) (Table 1, Fig. 1B and C). The ratio of regulated genes, genes without change, and downregulated genes (5, 55, 1) was significantly different from the hypothetical ratio without change (0, 61, 0) (Fig. 1D, Fisher's exact test, P = 0.027). However, the ratio (5, 55, 1) was not significantly different from the hypothetical ratio with equal up- and downregulation (3, 55, 3) (Fig. 1D, Fisher's exact test, P = 0.581). These results suggest that although thalidomide affects undifferentiated hiPSCs, it might not facilitate or inhibit the undifferentiated state. Notably, three transforming growth factor β (TGF-β) genes (BMP2, LEFTY1, and LEFTY2), which are related to mesoderm differentiation, including limb formation, were upregulated (Fig. 1B).

Reference: Biochem Biophys Rep. 2021 Mar 13;26:100978. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7973312/

In vivo activity

The CRBN protein is involved in thalidomide-induced degradation of EGFL6. Overexpression of EGFL6 induced the development of abnormal subintestinal vein vessels in a zebrafish model, a process that was impaired by knocking down PAX6 or treatment with thalidomide. These findings established that thalidomide regulates EGFL6 expression through proteasome degradation to inhibit the EGFL6/PAX6 axis-driven angiogenesis in SBVM.

Reference: Cell Mol Life Sci. 2020; 77(24): 5207–5221. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7671996/

Note: The information listed here was extracted from literature. MedKoo has not independently retested and confirmed the accuracy of these methods. Customer should use it just for a reference only.