

Product Data Sheet

Product Name: Purpurin 18

Cat. No.: GC60312

Chemical Properties

Cas. No. 25465-77-4

SMILES O=C(O1)/C2=C([C@H]3CCC(O)=O)/N=C([C@H]3C)/C=C(C(C)=C/4C=C)\NC4=C/C5=N/C(C(CC)=C5C)=C\C6=C(C)C(C1=O)=C2N6

Formula $C_{33}H_{32}N_4O_5$ M.Wt 564.63

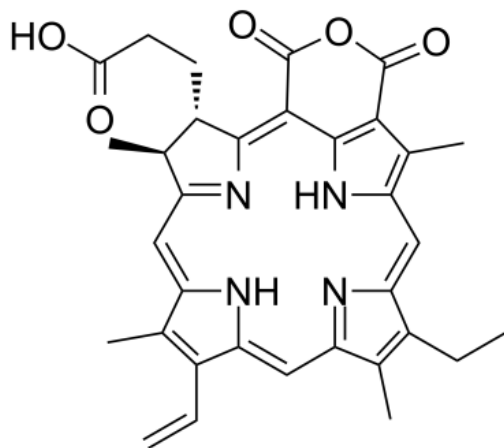
Solubility DMSO : 10 mg/mL (17.71 mM; ultrasonic and warming and heat to 60°C); Ethanol : < 1 mg/mL (insoluble)

Storage Store at -20°C

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]:

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Cell lines	HL60 cells (human promyelocytic leukemia cell line)
Preparation Method	HL60 cells were maintained in RPMI medium supplemented with 10% fetal calf serum (FCS) at 37°C, 5% CO ₂ . HL60 cells were pre-incubated with Purpurin 18 (0.2–0.5µM) in the dark for 16 hours and then irradiated with red light (600–700nm).
Reaction Conditions	0.2–0.5µM; 16h.
Applications	Purpurin 18 in combination with light significantly induced apoptosis (DNA laddering, increase in subdiploid DNA content, and phosphatidylserine externalization) at low concentrations via caspase-3 activation, while Purpurin 18 induced rapid necrosis (loss of membrane integrity, trypan blue positivity) at higher concentrations.

Animal experiment [2]:

Animal models	Female Balb/c mice bearing subcutaneous 4T1 mammary carcinoma
Preparation Method	Mice were intratumorally administered Purpurin 18 (0.625mg/kg) dissolved in saline with 5% Tween 80. At 2 hours post-injection, the tumor area was irradiated with 660nm laser light (600J/cm ² , 500mW/cm ² for 20min with 1min on/off intervals). The treatment was performed every 2 days for a total of 3 times. Mice were monitored for tumor volume, body weight, and survival for 14–28 days. Blood and major organs were collected for analysis at the endpoint.

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Dosage form 0.625mg/kg; intratumoral injection; three treatments at 2-day intervals.

Applications Purpurin 18-mediated photodynamic therapy (PDT) significantly inhibited subcutaneous tumor growth and extended the survival time of tumor-bearing mice. The treatment did not cause significant changes in mouse body weight or induce functional toxicity to the liver and kidneys, as indicated by normal serum levels of ALT, AST, and urea.

References:

- [1] Di Stefano A, Ettorre A, Sbrana S, et al. Purpurin-18 in combination with light leads to apoptosis or necrosis in HL60 leukemia cells. *Photochem Photobiol.* 2001 Mar;73(3):290-6.
- [2] Huang P, Zhang B, Yuan Q, et al. Photodynamic treatment with purpurin 18 effectively inhibits triple negative breast cancer by inducing cell apoptosis. *Lasers Med Sci.* 2021 Mar;36(2):339-347.

Background

Purpurin 18 is a chlorophyll-derived chlorin photosensitizer that absorbs near-infrared light in the 700–850nm range and generates reactive oxygen species (ROS) to disrupt mitochondrial membrane potential and induce apoptosis^[1-2]. Purpurin 18 is applicable for cancer-related research in photodynamic therapy^[3-4].

In vitro, HeLa (human cervical carcinoma) and A549 (human lung adenocarcinoma) cells were treated with Purpurin 18 (1–10 μ M) for 24 hours, followed by light irradiation (2J/cm²) for 15 minutes. Under light conditions, Purpurin 18 induced cancer cell apoptosis via ROS generation, and when combined with doxorubicin (DOX) in nano-transferosomes (F7), Purpurin 18 exhibited a synergistic anticancer effect^[5]. HL60 human promyelocytic leukemia cells were pre-treated with Purpurin 18 (0.2–0.5 μ M) in the dark for 16 hours, then irradiated with red light (1J/cm²). Within 1–6 hours post-irradiation, Purpurin 18 induced apoptosis by activating caspase-3, resulting in DNA ladder formation, increased sub-diploid DNA content, and phosphatidylserine externalization^[6].

In vivo, female Balb/c mice bearing subcutaneous 4T1 tumors were intratumorally administered

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Purpurin 18 (0.625mg/kg), and 2 hours later, the tumor site was irradiated with a 660nm laser (600J/cm²). Treatment was repeated every 2 days for a total of 3 times. Purpurin 18-mediated photodynamic therapy (PDT) significantly inhibited tumor growth and extended the survival time of tumor-bearing mice, without affecting body weight or major organ functions^[7]. Female C57BL/6 mice bearing subcutaneous B16F10 melanoma received Purpurin 18 (0.6mg/kg) combined with Epacadostat (3mg/kg) via tail vein injection, followed 12 hours later by 671nm laser irradiation (0.8W/cm²) of the tumor for 2 minutes. The treatment was repeated every 2 days for 3 cycles. Purpurin 18-based photoimmunotherapy significantly suppressed primary tumor growth, prolonged survival, effectively activated antitumor immunity, and inhibited lung metastasis^[8].

References:

- [1] Hooper JK, Sery TW, Yamamoto N. Photodynamic sensitizers from chlorophyll: purpurin-18 and chlorin p6. *Photochem Photobiol.* 1988 Nov;48(5):579-82.
- [2] Walker I, Vernon DI, Brown SB. The solid-phase conjugation of purpurin-18 with a synthetic targeting peptide. *Bioorg Med Chem Lett.* 2004 Jan 19;14(2):441-3.
- [3] Yeo S, Wu H, Song YK, et al. Encapsulation of synthesized purpurin-18-N-aminoimide methyl ester in lipid nanovesicles for use as agents in photodynamic cancer therapy. *J Pharm Sci.* 2025 Feb;114(2):1504-1511.
- [4] Yeo S, Song HH, Kim MJ, et al. Synthesis and Design of Purpurin-18-Loaded Solid Lipid Nanoparticles for Improved Anticancer Efficiency of Photodynamic Therapy. *Pharmaceutics.* 2022 May 15;14(5):1064.
- [5] Yeo S, Kim MJ, Yoon I, et al. pH-Responsive Nano-transferosomes of Purpurin-18 Sodium Salt and Doxorubicin for Enhanced Anticancer Efficiency by Photodynamic and Chemo Combination Therapy. *ACS Omega.* 2023 Apr 26;8(18):16479-16490.
- [6] Di Stefano A, Ettore A, Sbrana S, et al. Purpurin-18 in combination with light leads to apoptosis or necrosis in HL60 leukemia cells. *Photochem Photobiol.* 2001 Mar;73(3):290-6.
- [7] Huang P, Zhang B, Yuan Q, et al. Photodynamic treatment with purpurin 18 effectively inhibits triple negative breast cancer by inducing cell apoptosis. *Lasers Med Sci.* 2021 Mar;36(2):339-347.
- [8] Chen Y, Xu S, Ren S, et al. Design of a targeted dual drug delivery system for boosting the efficacy of photoimmunotherapy against melanoma proliferation and metastasis. *J Adv Res.* 2025 May;71:533-550.

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