

Product Data Sheet

Product Name: Palmitic acid

Cat. No.: GN10676

Chemical Properties

Cas. No. 57-10-3

Chemical Name hexadecanoic acid

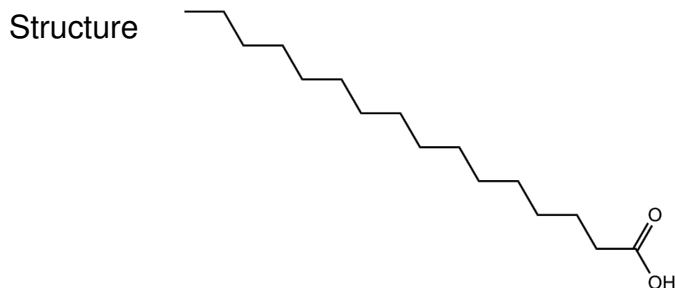
SMILES CCCCCCCCCCCCCCCC(=O)O

Formula $C_{16}H_{32}O_2$ M.Wt 256.42

Solubility $\geq 51\text{mg/mL}$ in DMSO; $\geq 51\text{mg/mL}$ in Ethanol Storage Store at -20°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.



Protocol

Cell experiment [1]:

Cell lines Ishikawa cells

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

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA

Product Data Sheet

Preparation of Palmitic acid working solution: Add 78μl of anhydrous ethanol to 1mg Palmitic acid and dissolve to 50mM stock solution (ultrasonic heating for 3min; 37°C); Take an appropriate amount of Fatty acid free BSA Add DMEM culture medium to prepare a 10% BSA solution (100mg/ml). Take 5μl of Palmitic acid stock solution (50mM), add 100μl of BSA solution (10%), mix well (ultrasonic heating for 3min; 37°C), add 895μl of DMEM culture medium, mix well (ultrasonic heating for 3min; 37°C) to prepare 0.25mM Palmitic acid working solution.

Preparation Method

Ishikawa cells were cultured in DMEM/F-12 medium enriched with 10% fetal bovine serum (FBS) and 1% antimycotic-antibiotic at 37°C in 5% CO₂/atmosphere. Cells were seeded at a density of 2×10^4 cells/ml in the 96-well plates and allowed to adhere in a 5% CO₂ incubator at 37°C for 24h. The cells were treated with different concentrations of Palmitic acid (0, 0.1, 1, 10, 50, 100, and 250μM) for 96h. The cell viability was evaluated.

Reaction Conditions 0, 0.1, 1, 10, 50, 100, and 250μM; 96h

Applications Palmitic acid treatment significantly inhibited cell viability of Ishikawa cells in a dose-dependent manner.

Animal experiment [2]:

Animal models Male BALB/c nude mice

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

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA

Product Data Sheet

Preparation Method

Male BALB/c nude mice (6-week-old; 18-22g) were housed in a room with controlled temperature (21-23°C), humidity (55%-60%) and lighting (12h light/dark cycle) and were supplied with water ad libitum. Approximately 5×10^6 SGC-7901 cells were injected into the flanks of the nude mice to establish a human gastric cancer syngeneic s.c. xenograft model. When the cancer volume reached approximately 50mm^3 , Palmitic acid was administered via i.p. injections once daily at the designed doses (50mg/kg or vehicle) for 18 days. Cancer growth and mouse body weights were measured every other day throughout the experiment. Cancer volumes (mm^3) were calculated as $0.5 \times \text{length}(\text{mm}) \times \text{width}^2(\text{mm})$.

Dosage form

50mg/kg/day; 18 days; i.p.

Applications

Palmitic acid treatment significantly inhibited the tumor growth in the SGC-7901 xenograft mouse model, without affecting body weight.

References:

- [1] Zhao Z, Wang J, Kong W, et al. Palmitic acid exerts anti-tumorigenic activities by modulating cellular stress and lipid droplet formation in endometrial cancer[J]. *Biomolecules*, 2024, 14(5): 601.
[2] Yu X, Peng W, Wang Y, et al. Palmitic acid inhibits the growth and metastasis of gastric cancer by blocking the STAT3 signaling pathway[J]. *Cancers*, 2023, 15(2): 388.

Background

Palmitic acid is a 16-carbon long-chain saturated fatty acid that can post-translationally modify proteins [1]. Palmitic acid can reduce the expressions of p-STAT3, p-JAK2, n-cadherin and vimentin, inhibit the nuclear localization of p-STAT3, and thereby suppress tumor cell metastasis and proliferation [2]. Palmitic acid has been widely used to enhance the signal transduction induced by TLR4 and to strengthen the inflammatory response [3].

In vitro, Palmitic acid treatment for 72 hours significantly inhibited the viability of Ishikawa cells and

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

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA

Product Data Sheet

ECC-1 cells, with IC₅₀ values of 348.2μM and 187.3μM, respectively^[4]. Treatment with 300μM Palmitic acid for 24 hours significantly induced the production of reactive oxygen species (ROS) in HepG2 cells and led to a decrease in mitochondrial membrane potential^[5]. 150μM of Palmitic acid treatment for 12 hours significantly promoted the maturation of monocyte-derived dendritic cells (MoDCs) and the secretion of IL-1β^[6].

In vivo, Palmitic acid treatment via intraperitoneal injection at a dose of 50mg/kg/day for 18 days significantly inhibited the tumor growth in the SGC-7901 xenograft mouse model, without affecting body weight^[7]. A single intraperitoneal injection of 30μmol (50μl) of Palmitic acid reduced the locomotor activity of mice within 2 hours, induced anxiety-like behaviors in mice, and simultaneously increased serotonin metabolism mediated by the amygdala^[8].

References:

- [1] Fatima S, Hu X, Gong R H, et al. Palmitic acid is an intracellular signaling molecule involved in disease development[J]. Cellular and Molecular Life Sciences, 2019, 76(13): 2547-2557.
- [2] Wang X, Zhang C, Bao N. Molecular mechanism of palmitic acid and its derivatives in tumor progression[J]. Frontiers in oncology, 2023, 13: 1224125.
- [3] Korbecki J, Bajdak-Rusinek K. The effect of palmitic acid on inflammatory response in macrophages: an overview of molecular mechanisms[J]. Inflammation Research, 2019, 68(11): 915-932.
- [4] Zhao Z, Wang J, Kong W, et al. Palmitic acid exerts anti-tumorigenic activities by modulating cellular stress and lipid droplet formation in endometrial cancer[J]. Biomolecules, 2024, 14(5): 601.
- [5] Alnahdi A, John A, Raza H. Augmentation of glucotoxicity, oxidative stress, apoptosis and mitochondrial dysfunction in HepG2 cells by palmitic acid[J]. Nutrients, 2019, 11(9): 1979.
- [6] Nicholas D A, Zhang K, Hung C, et al. Palmitic acid is a toll-like receptor 4 ligand that induces human dendritic cell secretion of IL-1β[J]. PloS one, 2017, 12(5): e0176793.
- [7] Yu X, Peng W, Wang Y, et al. Palmitic acid inhibits the growth and metastasis of gastric cancer by blocking the STAT3 signaling pathway[J]. Cancers, 2023, 15(2): 388.
- [8] Moon M L, Joesting J J, Lawson M A, et al. The saturated fatty acid, palmitic acid, induces anxiety-like behavior in mice[J]. Metabolism, 2014, 63(9): 1131-1140.

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

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA