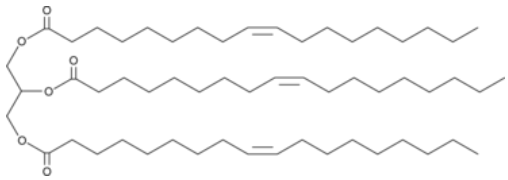
Product Data Sheet

Product Name: Triolein (1,2,3-Trioleoyl-rac-glycerol)
Cat. No.: GC41776

Chemical Properties

Cas. No.	122-32-7		
Chemical Name	9Z-octadecenoic acid, 1,1',1"-(1,2,3-propanetriyl) ester		
SMILES	O=C(CCCCCCC/C=C\CCCCCCCC)OCC(OC(CCCCCCC/C=C\CCCCCCCC)=O)COC(CCCCCCC/C=C\CCCCCCCC)=O		
Formula	$C_{57}H_{104}O_6$	M.Wt	885.4
Solubility	DMSO : 100 mg/mL (112.94 mM; Need ultrasonic)	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	Human umbilical vein endothelial cells (EC)

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Preparation Method	EC were cultured in Dulbecco's Modified Eagle medium (DMEM) supplemented with 10% fetal bovine serum, maintained in a humidified atmosphere containing 5% CO_2 at 37°C. EC were treated with oxidized low-density lipoprotein (ox-LDL, 50μg/mL) for 24 hours, followed by treatment with Triolein (10μM) for another 24 hours.
Reaction Conditions	10μM; 24 hours
Applications	Triolein significantly increased cell viability and reduced apoptosis in ox-LDL-stimulated EC. Triolein also inhibited the expression of ICAM-1 and E-selectin mRNA, and enhanced the antioxidant defense system by increasing SOD and GPX activities while decreasing MDA content

Animal experiment [2]:

Animal models	C57BL/6J mice
Preparation Method	Mice underwent middle cerebral artery occlusion/reperfusion (MCAO/R) surgery and were treated with Triolein (40mg/kg) by oral gavage 30 minutes after reperfusion, twice daily for three days.
Dosage form	40mg/kg; oral gavage
Applications	Triolein administration significantly reduced cerebral infarct volume, enhanced neurological recovery, attenuated M1 microglial activation, and inhibited inflammation and autophagy in MCAO/R-induced mice.

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

References:
[1] Luo T, Deng ZY, Li XP, et al. Triolein and trilinolein ameliorate oxidized low-density lipoprotein-induced oxidative stress in endothelial cells. Lipids. 2014 May;49(5):495-504.
[2] Wang C, Li Y, Zhang Y, Smerin D, et al. Triolein alleviates ischemic stroke brain injury by regulating autophagy and inflammation through the AKT/mTOR signaling pathway. Mol Med. 2024 Dec 6;30(1):242.

Background

Triolein (1,2,3-Trioleoyl-rac-glycerol) is a triglyceride that has been utilized in the study of lipid metabolism-related processes[1]. Triolein can serve as a model substrate to investigate the digestion, absorption, and transport of fats within the body[2]. The content of Triolein and other related indicators hold significant reference value for assessing the quality and characteristics of oils and fats. Triolein is one of the key factors in measuring the nutritional components and related qualities of oils[3]. Additionally, Triolein can be employed as a carrier in the construction of drug delivery systems, aiding in the effective transportation and targeted release of drugs[4].

In vitro, pre-treatment of the human bulge stem cell line Tel-E6E7 with Triolein (20μM) for 24 hours, followed by UVB irradiation (6.8mJ/cm^2), significantly inhibited the expression of the pro-inflammatory cytokine IL-6, reduced the generation of reactive oxygen species (ROS), and decreased the expression of matrix metalloproteinase 1 (MMP1) in fibroblasts[5]. Pre-treatment of human umbilical vein endothelial cells with Triolein (10μM) for 24 hours, followed by stimulation with oxidized low-density lipoprotein (ox-LDL, 50μg/ml) for 24 hours, significantly increased cell viability, reduced apoptosis, inhibited the expression of intercellular adhesion molecule-1 (ICAM-1) and E-selectin mRNA, enhanced the antioxidant defense system, decreased malondialdehyde (MDA) content, and increased the activity of superoxide dismutase (SOD) and glutathione peroxidase (GPX)[6].

In vivo, a single dose of Triolein (65%; 2mL) was administered via gastric gavage to lactating rats that had been starved for 18 hours and then re-fed. Triolein significantly inhibited the activation of lipogenesis in the mammary gland during re-feeding, decreased glucose uptake, increased glucose 6-phosphate concentration, and decreased fructose 1,6-bisphosphate concentration[7]. Triolein (40mg/kg) was orally administered to C57BL/6J mice starting at 8-10 weeks of age and continued for

10 days. Triolein significantly reduced cerebral infarct volume, enhanced neurological recovery, inhibited the activation of M1 microglia and inflammatory response, and suppressed autophagy following ischemic stroke via the AKT/mTOR signaling pathway[8].

References:

[1] Tajima S, Yokoyama S, Yamamoto A. Mechanism of action of lipoprotein lipase on triolein particles: effect of apolipoprotein C-II. J Biochem. 1984 Dec;96(6):1753-67.
[2] Shirai K, Ohsawa I, Ishikawa Y, et al. Human plasma carboxyl esterase-catalyzed triolein hydrolysis. Existence of promoting factor in serum. J Biol Chem. 1985 May 10;260(9):5225-7.
[3] Warner K, Neff WE, Byrdwell WC, et al. Effect of oleic and linoleic acids on the production of deep-fried odor in heated triolein and trilinolein. J Agric Food Chem. 2001 Feb;49(2):899-905.
[4] Zhang Z, Fang X, Hao J, et al. Triolein-based polycation lipid nanocarrier for efficient gene delivery: characteristics and mechanism. Int J Nanomedicine. 2011;6:2235-44.
[5] Leirós GJ, Kusinsky AG, Balañá ME, et al. Triolein reduces MMP-1 upregulation in dermal fibroblasts generated by ROS production in UVB-irradiated keratinocytes. J Dermatol Sci. 2017 Feb;85(2):124-130.
[6] Luo T, Deng ZY, Li XP, et al. Triolein and trilinolein ameliorate oxidized low-density lipoprotein-induced oxidative stress in endothelial cells. Lipids. 2014 May;49(5):495-504.
[7] Mercer SW, Williamson DH. Rapid inhibition by intragastric triolein of the re-activation of glucose utilization and lipogenesis in the mammary gland during the starved-refed transition in lactating rats. Evidence for a direct effect of oral lipid on mammary tissue. Biochem J. 1988 Feb 15;250(1):269-76.
[8] Wang C, Li Y, Zhang Y, Smerin D, et al. Triolein alleviates ischemic stroke brain injury by regulating autophagy and inflammation through the AKT/mTOR signaling pathway. Mol Med. 2024 Dec 6;30(1):242.