

Product Data Sheet

Product Name: Punicalagin

Cat. No.: GN10047

Chemical Properties

Cas. No. 65995-63-3

SMILES O=C1OC2=C(C3=C(C(C(C(OC[C@H]4OC5O)=O)=CC(O)=C6O)=C6O)C(O)=C2O)C(C1=C(C(C(O)=C7O)=C(C=C7O)C(O[C@H]4[C@@H]([C@H]5OC8=O)OC(C(C(C(C(O)=C9O)=C8C=C9O)=C%10O)=CC(O)=C%10O)=O)=O)C(O)=C%11O)=C%11OC3=O

Formula $C_{48}H_{28}O_{30}$

M.Wt 1084.72

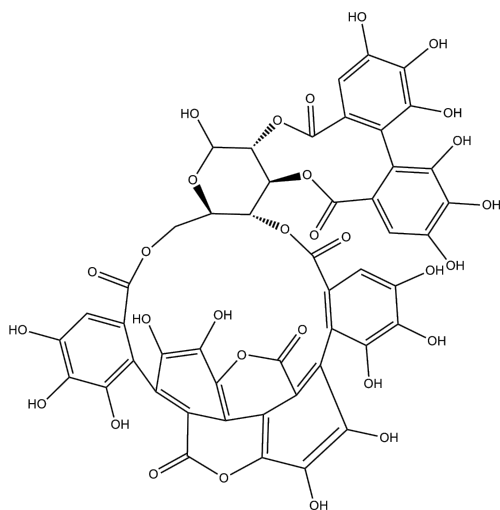
Solubility $\geq 108.4\text{mg/mL}$ in DMSO

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



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

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Protocol

Cell experiment [1]:

Cell lines PC-3, LNCaP, BPH-1 cells

Preparation Method PC-3, LNCaP and BPH-1 cells were cultured in a 96-well microtiter plate containing 0.1mL of RPMI growth media/well for 24h. Cells were incubated with Punicalagin dissolved in DMSO, and Punicalagin concentrations of 10, 50 and 100μM were used with incubation period of 24-96h. Cells were evaluated for their viability using the XTT assay.

Reaction
Conditions 10, 50, 100μM; 24h

Applications Punicalagin concentration-dependently inhibited viability in PC-3 and LNCaP cells, while viability in BPH-1 cells was insignificantly affected.

Animal experiment [2]:

Animal models DBA/1 mice

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Preparation Method DBA/1 mice (male, 8–9 weeks) were intradermally injected at the tail base with 200mg of bovine type II collagen emulsified at a 1:1 ratio (vol/vol) in Freund's complete adjuvant (day 0), and then boosted 21 days later using bovine type II collagen emulsified at a 1:1 ratio in incomplete Freund's adjuvant (day 21). Mice were randomly treated daily by intraperitoneal injection of DMSO (n=8) or Punicalagin (50mg/kg/day, n=8) for 14 days, which was initiated on the second day of booster immunization (day 22). Set up a normal control group including 8 mice without any treatment. Hindlimb samples were collected and fixed in 10% formalin for 48h. After a series of dehydration, waxing, and embedding, the joints were cut into 5µm thick sections for subsequent analysis.

Dosage form 50mg/kg/day for 14 days; i.p.

Applications Punicalagin alleviated arthritis severity and bone destruction, and decreased serum IL-6 and TNF-α in collagen-induced arthritis (CIA) mice.

References:

[1]Adaramoye O, Erguen B, Nitzsche B, et al. Punicalagin, a polyphenol from pomegranate fruit, induces growth inhibition and apoptosis in human PC-3 and LNCaP cells[J]. Chemico-biological interactions, 2017, 274: 100-106.

[2]Huang M, Wu K, Zeng S, et al. Punicalagin inhibited inflammation and migration of fibroblast-like synoviocytes through NF-κB pathway in the experimental study of rheumatoid arthritis[J]. Journal of inflammation research, 2021: 1901-1913.

Background

Punicalagin is a ellagitannin, a phenolic compound with antioxidant, anti-inflammatory and anticancer effects^[1, 2]. Punicalagin is a reversible and non-competitive 3-chymotrypsin-like protease (3CL^{pro}) inhibitor that inhibits SARS-CoV-2 replication in vitro^[3].

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In vitro, PC-3, LNCaP, and BPH-1 cells were treated with Punicalagin (10, 50, 100 μ M) for 24h. Punicalagin inhibited the viability of PC-3 and LNCaP cells in a dose-dependent manner, but had no significant effect on the viability of BPH-1 cells. Punicalagin (100 μ M) increased the expression of enrichment factors in PC-3 and LNCaP cells^[4]. Punicalagin (12.5-100 μ M) treatment of thyroid cancer cell line BCPAP cells for 24h-48h inhibited cell viability in a time- and dose-dependent manner and increased the number of autophagic vacuoles (AVO) in cells, but did not induce apoptosis^[5].

In vivo, Punicalagin (50mg/kg) was intraperitoneally injected into mice with collagen-induced arthritis (CIA) for 14 days, which reduced the severity of arthritis and bone destruction in mice and decreased serum IL-6 and TNF- α levels^[6]. Punicalagin (25, 50, 100mg/kg) was orally administered to pregnant rats with L-NAME-induced preeclampsia (PE) for 7 days, which significantly reduced diastolic blood pressure, systolic blood pressure and mean arterial pressure, restored angiogenesis balance, and enhanced placental antioxidant capacity^[7].

References:

- [1] Venusova E, Kolesarova A, Horky P, et al. Physiological and immune functions of punicalagin[J]. *Nutrients*, 2021, 13(7): 2150.
- [2] Rozadi N, Oktavia S, Fauziah F. Pharmacological Activities of Punicalagin: A Review[J]. *Journal of Drug Delivery and Therapeutics*, 2022, 12(2): 148-155.
- [3] Du R, Cooper L, Chen Z, et al. Discovery of chebulagic acid and punicalagin as novel allosteric inhibitors of SARS-CoV-2 3CLpro[J]. *Antiviral research*, 2021, 190: 105075.
- [4] Adaramoye O, Erguen B, Nitzsche B, et al. Punicalagin, a polyphenol from pomegranate fruit, induces growth inhibition and apoptosis in human PC-3 and LNCaP cells[J]. *Chemico-biological interactions*, 2017, 274: 100-106.
- [5] Cheng X, Gao Y, Yao X, et al. Punicalagin induces apoptosis-independent autophagic cell death in human papillary thyroid carcinoma BCPAP cells[J]. *RSC advances*, 2016, 6(72): 68485-68493.
- [6] Huang M, Wu K, Zeng S, et al. Punicalagin inhibited inflammation and migration of fibroblast-like synoviocytes through NF- κ B pathway in the experimental study of rheumatoid arthritis[J]. *Journal of inflammation research*, 2021: 1901-1913.
- [7] Wang Y, Huang M, Yang X, et al. Supplementing punicalagin reduces oxidative stress markers and restores angiogenic balance in a rat model of pregnancy-induced hypertension[J]. *The Korean journal of physiology & pharmacology*, 2018, 22(4): 409-417.

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