

Product Data Sheet

Product Name: StemRegenin 1 (SR1)

Cat. No.: GC17043

Chemical Properties

Cas. No. 1227633-49-9

Chemical Name 4-[2-[[2-(1-benzothiophen-3-yl)-9-propan-2-yl]purin-6-yl]amino]ethyl]phenol

SMILES CC(C)N1C=NC2=C1N=C(N=C2NCCC3=CC=C(C=C3)O)C4=CSC5=CC=CC=C54

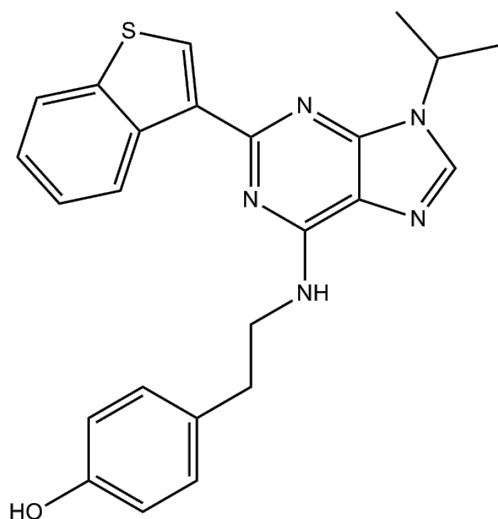
Formula $C_{24}H_{23}N_5OS$ M.Wt 429.54

Solubility $\geq 21.5\text{mg/mL}$ in DMSO, $\geq 3.41\text{mg/mL}$ in EtOH with ultrasonic 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]:

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

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Cell lines	Multipotent hematopoietic progenitors (MPs)
Preparation Method	Lin ⁻ CD34 ⁺ CD43 ⁺ CD235a/CD41a ⁻ MPs were plated in duplicate in 96-well plates containing 4x10 ³ cells/well. Cells were cultured in serum-free medium containing 10%BIT, 100μM 2-mercaptoethanol, and ExCyte in IMDM supplemented with 10ng/mL IL3, and 50ng/mL IL6 and SCF. StemRegenin 1 was added to the cultures at concentrations ranging from 1, 5 and 10μM. Viable cell count was determined using trypan blue.
Reaction Conditions	1-10μM; 7d
Applications	High-dose StemRegenin 1 inhibits cell proliferation.

Animal experiment [2]:

Animal models	Lethally irradiated mice model
Preparation Method	The C57BL/6 mice (male, 6–8 weeks) were purchased. Radiation exposure (1.0Gy/min) was performed as a single lethal dose of total body irradiation (TBI) using the X-RAD 320 device. To assess the efficacy of StemRegenin 1, TBI-exposed mice (6Gy, n = 10/group) were injected at 4h post-TBI with 100uL of normal saline or StemRegenin 1 (30μg/kg) via intraperitoneal injection. Survival was monitored for 30 days following irradiation.
Dosage form	30μg/kg; ip; 30d
Applications	Treatment with StemRegenin 1 significantly reduces mortality from total body irradiation.

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References:

- [1]. Tao L, Togarrati P P, Choi K D, et al. StemRegenin 1 selectively promotes expansion of multipotent hematopoietic progenitors derived from human embryonic stem cells[J]. Journal of Stem Cells & Regenerative Medicine, 2017, 13(2): 75.
- [2]. Hwang Y J, Shin D Y, Kim M J, et al. StemRegenin 1 mitigates radiation-mediated hematopoietic injury by modulating radioresponse of hematopoietic stem/progenitor cells[J]. Biomedicines, 2023, 11(3): 824.

Background

StemRegenin 1 (SR1) is a potent aromatic hydrocarbon receptor (AhR) antagonist ($IC_{50} = 127nM$)

[1]. StemRegenin 1 promotes the self-renewal of human CD34⁺ hematopoietic stem cells (HSCs/HSPCs) by inhibiting aromatic receptors, and can also promote the differentiation of pluripotent stem cells (iPSCs) into hematogenous progenitor cells [2-3]. StemRegenin 1 can serve as a potential mitigator for radiation-induced hematopoietic system damage [4].

In multipotent hematopoietic progenitors, High-dose StemRegenin 1 (1-10 μM ; 7d) inhibits cell proliferation [5]. In human endothelial progenitor cells, StemRegenin 1 (1 μM ; 48h) delays endothelial progenitor cell senescence by regulating AhR pathway-mediated CYP1A1 and ROS generation [6].

In lethally irradiated mice model, treatment with StemRegenin 1 (30 $\mu g/kg$; ip; 30d) significantly reduces mortality from total body irradiation [7]. In ovariectomized-induced bone loss mouse model, StemRegenin 1 (2.5mg/kg; ip; 42d) inhibits ovariectomy-induced bone loss in vivo [8].

References:

- [1]. Boitano A E, Wang J, Romeo R, et al. Aryl hydrocarbon receptor antagonists promote the expansion of human hematopoietic stem cells[J]. Science, 2010, 329(5997): 1345-1348.
- [2]. Kanashiro M A, Paul S K, Sone M, et al. iPSC-Derived Mesenchymal Stem Cells Supports the Ex Vivo expansion of Human Hematopoietic Stem and Progenitor Cells Via Sterile Inflammation Pathway[J]. Blood, 2023, 142: 2680.
- [3]. Singh J, Chen E L Y, Xing Y, et al. Generation and function of progenitor T cells from StemRegenin-1-expanded CD34⁺ human hematopoietic progenitor cells[J]. Blood advances, 2019,

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3(20): 2934-2948.

[4]. Guan D, Yang Y, Pang M, et al. Indole-3-carboxaldehyde ameliorates ionizing radiation-induced hematopoietic injury by enhancing hematopoietic stem and progenitor cell quiescence[J]. Molecular and cellular biochemistry, 2024, 479(2): 313-323.

[5]. Tao L, Togarrati P P, Choi K D, et al. StemRegenin 1 selectively promotes expansion of multipotent hematopoietic progenitors derived from human embryonic stem cells[J]. Journal of Stem Cells & Regenerative Medicine, 2017, 13(2): 75.

[6]. Lim H J, Jang W B, Rethineswaran V K, et al. StemRegenin-1 attenuates endothelial progenitor cell senescence by regulating the AhR pathway-mediated CYP1A1 and ROS generation[J]. Cells, 2023, 12(15): 2005.

[7]. Hwang Y J, Shin D Y, Kim M J, et al. StemRegenin 1 mitigates radiation-mediated hematopoietic injury by modulating radioresponse of hematopoietic stem/progenitor cells[J]. Biomedicines, 2023, 11(3): 824.

[8]. Zhou S, Li J, Ying T, et al. StemRegenin 1 attenuates the RANKL-induced osteoclastogenesis via inhibiting AhR-c-src-NF- κ B/p-ERK MAPK-NFATc1 signaling pathway[J]. Iscience, 2024, 27(5).

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