Product Data Sheet

Product Name: STF 31
Cat. No.: GC14803

Chemical Properties

Cas. No.	724741-75-7		
Chemical Name	4-((4-(tert-butyl)phenylsulfonamido)methyl)-N-(pyridin-3-yl)benzamide		
SMILES	O=S(NCC1=CC=C(C(NC2=CC=CN=C2)=O)C=C1)(C3=CC=C(C=C3)C(C)(C)C)=O		
Formula	$C_{23}H_{25}N_3O_3S$	M.Wt	423.53
Solubility	≥ 42.4mg/mL in DMSO	Storage	Store at RT
General tips	For obtaining a higher solubility , please warm the tube at 37 ℃ and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20℃ 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	STF 31		

Protocol

Cell experiment [1]:

Cell lines	B6M7

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Preparation Method	B6M7 cells were seeded into 96-well plates with 6000 cells per well and cultured for 24h. They were treated with different concentrations of STF 31(0, 0.01, 0.1, 1, 5, and 10μM).for 24 h to 48 h.Cells were washed twice with PBS and incubated in serum-free DMEM overnight prior to the assay. Glucose uptake was measured using a Glucose Uptake Assay Kit (ab136955, Abcam) according to the manufacturer's instructions, and fluorescence was detected using a FLUOstar Omega microplate reader (BMG Labtech). Cell viability was assessed using the AlamarBlue® assay (Thermo Fisher Scientific) following the manufacturer's protocol.
Reaction Conditions	0, 0.01, 0.1, 1, 5, and 10μM; 24 h, 48 h.
Applications	STF 31 dose-dependently suppressed glucose uptake in B6M7 cells without affecting cell viability.

Animal experiment [1]:

Animal models	C57BL/6J and *CX3CR1*$^{gfp/+}$ mice

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Preparation Method	C57BL/6 J mice received intraperitoneal STF 31 at 10 mg/kg twice daily for 2 days and once daily for a further 3 days, with DMSO-treated mice as controls. Body weight and electroretinography were assessed on day 6, and eyes were collected for immunohistochemistry (4 mice per group). *CX3CR1$^{gfp/+}$* mice were given the same STF 31 regimen starting 1 day prior to light exposure. After 16 h of dark adaptation, pupil dilation, and anesthesia, mice were exposed to 50,000 lx focal white light for 10 min. Clinical and immunohistochemical analyses were performed after treatment (5 mice per group).
Dosage form	10mg/kg, twice daily for 2 days, followed by once daily for another 3 days; i.p.
Applications	STF 31 treatment improved photoreceptor survival and attenuated microglial activation in *CX3CR1$^{gfp/+}$* mice, without inducing retinal cell death in C57BL/6J mice.

References:
[1] Wang L X, Pavlou S, Du X, et al. Glucose transporter 1 critically controls microglial activation through facilitating glycolysis[J]. Mol Neurodegener, 2019, 14.

Background

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Background

STF 31 is a cell-permeable inhibitor of glucose transporter 1 (GLUT1) with an IC_{50} of 1μM[1]. GLUT1 is a key transporter responsible for glucose uptake and plays an essential role in maintaining glycolytic metabolism[2]. STF 31 can inhibit nicotinamide phosphoribosyltransferase (NAMPT), thereby disrupting glycolysis and inducing cytotoxicity[3].

In vitro, STF 31 (0-10μM) treatment inhibited the glucose uptake capacity of B6M7 cells in a dose-dependent manner within 24h without significantly affecting cell viability[4]. STF 31 (30μM) treatment of MCF-7 cells for 48h significantly suppressed glycolysis and induced apoptosis[5]. STF 31 (2, 4, and 8μM) treatment of rheumatoid arthritis fibroblast-like synoviocytes (RAFLs) for 24-72h inhibited cell proliferation in a time- and dose-dependent manner[6].

In vivo, STF 31 (10mg/kg), administered via intraperitoneal injection (twice daily for the first 2 days, followed by once daily for the next 3 days), had no significant effects on body weight, behavior, or ERG responses in normal mice. In a light-induced model, STF 31 significantly inhibited microglial activation in $CX3CR1^{gfp/+}$ mice and alleviated retinal degeneration[4]. Intraperitoneal co-administration of STF 31 (10mg/kg) and dexamethasone in normal mice for 4h significantly promoted the accumulation of necrotic thymocytes[7].

References:
[1] Chan D A, Sutphin P D, Nguyen P, et al. Targeting GLUT1 and the Warburg Effect in Renal Cell Carcinoma by Chemical Synthetic Lethality[J]. Sci Transl Med, 2011, 3(94).
[2] Wu Q, ba-alawi W, Deblois G, et al. GLUT1 inhibition blocks growth of RB1-positive triple negative breast cancer[J]. Nat Commun, 2020, 11(1).
[3] Adams D J, Ito D, Rees M G, et al. NAMPT Is the Cellular Target of STF 31-Like Small-Molecule Probes[J]. Acs Chem Biol, 2014, 9(10): 2247-2254.
[4] Wang L X, Pavlou S, Du X, et al. Glucose transporter 1 critically controls microglial activation through facilitating glycolysis[J]. Mol Neurodegener, 2019, 14.
[5] Xintaropoulou C, Ward C, Wise A, et al. A comparative analysis of inhibitors of the glycolysis pathway in breast and ovarian cancer cell line models[J]. Oncotarget, 2015, 6(28): 25677-25695.

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[6] Hou Hou, Lü Xing, Zhang Na, et al. Mechanism Analysis of the Effect of STF 31 on Proliferation and Apoptosis of Fibroblast-like Synoviocytes in Rheumatoid Arthritis [J]. Anatomical Research, 2022, 44(06): 525-531
[7] Morioka S, Perry JSA, Raymond MH, et al. Efferocytosis induces a novel SLC program to promote glucose uptake and lactate release[J]. Nature, 2018, 563(7733): 714-718.

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