

Product Data Sheet

Product Name: AK-7
Cat. No.: GC10676

Chemical Properties

Cas. No. 420831-40-9

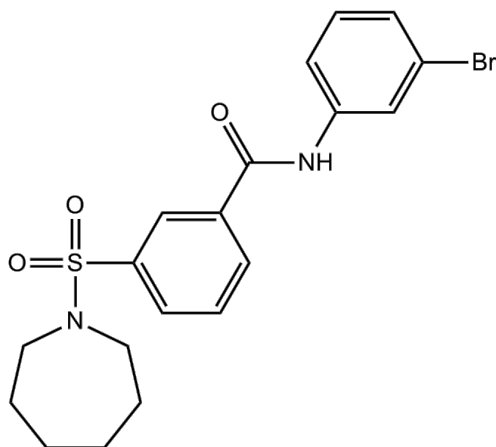
Formula C₁₉H₂₁BrN₂O₃S M.Wt 437.35

Solubility DMF: 15 mg/ml, DMF:PBS(pH7.2) (1:2): 0.3 mg/ml, DMSO: 5 mg/ml, Ethanol: 1 mg/ml
Storage Store at 2-8°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]:

Cell lines	PC-12 cells (rat adrenal pheochromocytoma cell line)
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Preparation Method	PC-12 cells were transfected with SIRT2-overexpressing adenovirus, then 48h later treated with 10 μ M AK-7; ferroptosis was induced with 5 μ M RSL3 for 24h after cell adherence. After treatment, cell viability was assessed by CCK-8, ROS/SOD/MDA/4HNE were measured by kits/ELISA, qRT-PCR was used for SIRT2/acetyl-NF-kB p65/total NF-kB p65/GPX4, and Western blot was used for acetyl-NF-kB p65, total NF-kB p65, GPX4 and 4HNE.
Reaction Conditions	10 μ M; 48h after adenovirus transfection
Applications	AK-7 elevated NF-kB p65 acetylation levels in PC-12 cells. AK-7 reversed SIRT2 overexpression-associated increases in SOD and GPX4 and decreases in ROS, MDA and 4HNE. AK-7 increased acetylated NF-kB p65 and 4HNE and reduced GPX4 at mRNA and protein levels.
Animal experiment [2]:	
Animal models	R6/2 mice (HD mouse model), 140CAG knock-in mice (HD mouse model)
Preparation Method	Mice were administered AK-7 at 10, 20, or 30mg/kg by intraperitoneal injection twice daily starting at 4 weeks of age. R6/2 mice were treated until 12 or 14 weeks of age for behavioral, survival, neuropathological, and biochemical analyses; 140CAG mice were treated until 6 months of age for behavioral testing and aggregate quantification. Motor performance was assessed by accelerating rotarod (R6/2) or open field (140CAG), survival was monitored, striatal and neuronal volumes were measured by stereology, and huntingtin aggregates were analyzed by immunohistochemistry and HTRF.
Dosage form	10-30mg/kg; i.p.; twice daily for 8-14 weeks

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Applications	AK-7 improved rotarod performance and open field activity, extended survival, increased striatal and striatal neuronal cell body volumes, and reduced mutant huntingtin aggregate volume in the striatum and striatal aggregate number in mice.
References:[1] Shi S, Zhang Z, Huang X, et al. Molecular regulatory mechanism of the SIRT2/NF- κ B p65 signaling pathway in ferroptosis-promoted spinal cord injury repair. BMC Neurol. 2025;25:463.[2] Chopra V, Quinti L, Kim J, et al. The Sirtuin 2 Inhibitor AK-7 is Neuroprotective in Huntington Disease Mouse Models. Cell Rep. 2013 Jan 3;3(1):247-255.	

Background

AK-7 is a cell-permeable and brain-permeable selective SIRT2 inhibitor ($IC_{50}=15.5\mu M$). AK-7 inhibits SIRT2 deacetylase activity through NAD^+ competition to increase substrate acetylation including α -tubulin, histone H4, and FOXO. AK-7 can be used for research on Huntington's disease, Parkinson's disease, chronic obstructive pulmonary disease airway inflammation, and neurodegeneration^[1-4].

In vitro, treatment of PC-12 cells with $10\mu M$ AK-7 for 48 hours inhibited SIRT2 expression, increased NF- κ B p65 acetylation levels, decreased superoxide dismutase levels, increased reactive oxygen species and malondialdehyde levels, decreased GPX4 levels, and increased 4HNE levels^[5]. Treatment of α -synuclein-overexpressing LUHMES cells with $12.5\mu M$ AK-7 for 10 days reduced adenylate kinase release in culture supernatant and attenuated α -synuclein-mediated cytotoxicity^[6]. Treatment of lipopolysaccharide-induced THP-1 cells with $25\mu M$ AK-7 for 20 hours improved adhesion response and activated CD18 expression after lipopolysaccharide stimulation, increased TNF and IL- 1β mRNA expression, and restored transendothelial migration of endotoxin-tolerant peripheral blood mononuclear cells^[7].

In vivo, daily intraperitoneal injection of 10-30mg/kg AK-7 twice daily to R6/2 mice for 8-10 weeks improved rotarod performance and open field activity, extended survival, increased striatal and striatal neuronal cell body volumes, and reduced mutant huntingtin aggregate volume in the striatum and striatal aggregate number^[8]. Daily intraperitoneal injection of 5.0mg/kg AK-7 to male ddY mice from day 14 to day 20 after olfactory bulbectomy shortened immobility time in tail suspension test,

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restored sucrose preference and Y-maze spontaneous alternation behavior, prolonged passive avoidance latency, and decreased prefrontal cortex SirT2, M1 microglial markers CD86, iNOS, IL-1 β , and TNF- α ^[9]. Intraperitoneal injection of 10mg/kg or 20mg/kg AK-7 to ICR mice 30 minutes before middle cerebral artery occlusion surgery and 6 hours and 24 hours after surgery reduced cerebral infarct volume, decreased surgical mortality, improved behavioral functions including tail suspension, rotarod, corner test, neurological score, and beam walk, and enhanced pP38 activity in the ischemic hemisphere^[10].

References:

- [1] Yadav V, Pandey V, Gaglani P, et al. Inhibiting SIRT-2 by AK-7 restrains airway inflammation and oxidative damage promoting lung resurgence through NF- κ B and MAP kinase signaling pathway. *Front Immunol*. 2024 Jun 24;15:1404122.
- [2] Guclu E, Inan SY, Vural HC. The Sirtuin 2 Inhibitor AK-7 Leads to an Antidepressant-Like Effect in Mice via Upregulation of CREB1, BDNF, and NTRK2 Pathways. *Mol Neurobiol*. 2022 Nov;59(11):7036-7044.
- [3] Yadav V, Pandey V, Gaglani P, et al. SIRT-2 inhibition by AK-7 orchestrates fibrotic cascades in airways through neuroimmune interaction via TRPA1, TRPM8 and TGF- β signalling. *Biochem Pharmacol*. 2025 Feb;232:116689.
- [4] Guan Q, Wang M, Chen H, et al. Aging-related 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine-induced neurochemical and behavioral deficits and redox dysfunction: improvement by AK-7. *Exp Gerontol*. 2016 Sep;82:19-29.
- [5] Choi EJ, Kim GH. Daidzein causes cell cycle arrest at the G1 and G2/M phases in human breast cancer MCF-7 and MDA-MB-453 cells. *Phytomedicine*. 2008;15(8):683-690.
- [6] Shi S, Zhang Z, Huang X, et al. Molecular regulatory mechanism of the SIRT2/NF- κ B p65 signaling pathway in ferroptosis-promoted spinal cord injury repair. *BMC Neurol*. 2025;25:463.
- [7] Shrestha D, Pant B, Ahuja A, et al. SIRT2 Regulates Ex Vivo PBMC Adhesion in Septic Shock Patients. *Shock*. 2026 Mar;65(3):406-417.
- [8] Chopra V, Quinti L, Kim J, et al. The Sirtuin 2 Inhibitor AK-7 is Neuroprotective in Huntington's Disease Mouse Models. *Cell Rep*. 2013 Jan 3;3(1):247-255.
- [9] Takahashi K, Kurokawa K, Hiraga D, et al. SirT2 Inhibition is Associated with Improvements in Depression-like Behavior and Memory Impairment in Olfactory Bulbectomized Mice. *Mol Neurobiol*. 2026;63:574.
- [10] Wu D, Lu W, Wei Z, et al. Neuroprotective effect of Sirt2-specific inhibitor AK-7 against acute cerebral ischemia is P38 activation-dependent in mice. *Neuroscience*. 2018;374:29-39.

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