Product Datasheet

MK2206

Catalog No. **BP-02468** · CAS **1032350-13-2** · Form **free base** · Physical state **solid** · Color **Light yellow to yellow** · Version **1.0** · Revision **2026-09-10**

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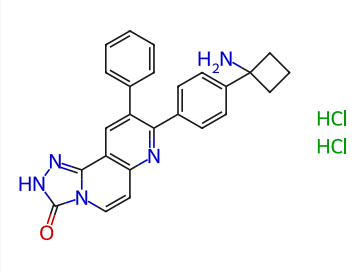
Target	Research area
Bcl-2 Family; Apoptosis; mTOR; Akt; GSK-3	**Cardiovascular Disease; Inflammation/Immunology; Cancer**

Molecular formula	$C_{25}H_{23}Cl_2N_5O$
Molecular weight	**480.3890**

STRUCTURE



DESCRIPTION

MK-2206 dihydrochloride (MK-2206 2HCl) is an orally active pan-AKT inhibitor, with IC50 values of 8 nM, 12 nM and 65 nM against AKT1, AKT2 and AKT3, respectively. MK-2206 dihydrochloride inhibits the Akt/mTOR signaling pathway and reduces the levels of downstream GSK3β and Mcl-1 via proteasomal degradation. MK-2206 dihydrochloride induces G1-phase cell cycle arrest, apoptosis, epithelial-mesenchymal transition, fibroblast activation and extracellular matrix deposition. MK-2206 dihydrochloride causes transient hyperglycemia and hyperinsulinemia in animals. MK-2206 dihydrochloride can be used in research related to solid tumors, renal fibrosis and hypercholesterolemia .

BIOLOGICAL ACTIVITY

In Vitro

MK-2206 dihydrochloride inhibits Akt1 kinase activity in various human cancer cell lines with an IC50 of approximately 20 nM, blocks the downstream signaling pathway of Akt, and exerts potent antiproliferative effects on cancer cell lines with specific PI3K pathway gene defects, while activation of the Ras pathway predicts no response[1].

MK-2206 dihydrochloride exerts additive or synergistic antiproliferative and pro-apoptotic sensitizing effects when combined with various chemotherapeutic agents and targeted inhibitors in relevant human cancer cell lines[1].

MK-2206 (72 h) dihydrochloride potently inhibits the growth of U937, OCI/AML3, MV-4-11 and MOLM-13 acute myeloid leukemia (AML) cell lines, with IC50 values ranging from 0.6 to 2.5 μM, while it exhibits only extremely low cytotoxicity against normal human peripheral blood mononuclear cells (PBMCs)[2].

MK-2206 (1-10 μM; 24 h) dihydrochloride induces dose-dependent G1 cell cycle arrest in OCI/AML3, MOLM-13 and MV-4-11 AML cell lines[2].

MK-2206 (1-10 μM; 24 h) dihydrochloride induces dose-dependent apoptosis in OCI/AML3, MOLM-13 and MV-4-11 acute myeloid leukemia (AML) cell lines, with a significant increase in apoptotic cell populations at higher doses[2].

MK-2206 (0.1-10 μM; 2-24 h) dihydrochloride induces apoptosis in MV-4-11 acute myeloid leukemia (AML) cells via caspase-3 and PARP cleavage, downregulates Mcl-1 protein levels in MV-4-11, OCI/AML3 and U937 AML cells in a dose-dependent manner, and inhibits the phosphorylation of Akt at Ser473 and GSK3β at Ser9 after 2 to 24 h of treatment, respectively[2].

MK-2206 (10 μM; 1-4 h) dihydrochloride induces downregulation of Mcl-1 in MV-4-11 acute myeloid leukemia (AML) cells via a GSK3β-mediated proteasome-dependent mechanism[2].

Combined administration of MK-2206 (200 nM; 72 h) dihydrochloride and Cytarabine (HY-13605) synergistically enhances cytotoxicity in MV-4-11, MOLM-13 and OCI/AML3 acute myeloid leukemia (AML) cell lines (ED50 CI value < 1), but exhibits antagonistic effects in U937 AML cells (ED50 CI value = 1.13)[2].

MK-2206 (0.5-5 μM; 48 h) dihydrochloride inhibits TGF-β1-induced fibrosis, epithelial-mesenchymal transition (EMT), and activation of the Akt/mTOR signaling pathway in HK-2 cells. The effective concentration is 1 μM, which reduces the mRNA expression of Collagen I and Fibronectin, restores E-cadherin levels, and suppresses the expression of mesenchymal markers and phosphorylated Akt/mTOR proteins[3].

MK-2206 (0.5-20 μM; 2-24 h) dihydrochloride upregulates LDLR protein levels in HepG2 cells treated with sterol feeding or sterol starvation. The maximum induction effect is observed in the sterol starvation group treated with 5 μM for 14 h, while that in the sterol feeding group is achieved with 10 μM treatment for 14 h. Moreover, a significant induction effect occurs within 4 h of treatment with 5 μM[4].

MK-2206 (2.5-5 μM; 2-6 h) dihydrochloride inhibits the activity of AKT kinase in sterol-fed HepG2 cells. At concentrations ≥2.5 μM, it reduces the phosphorylation levels of AKT and its downstream target PRAS40 within 2 h[4].

MK-2206 (5 μM; 14 h) dihydrochloride increases cell-surface LDLR expression and stimulates LDL uptake in HepG2 cells under both sterol-fed and sterol-starved conditions[4].

MK-2206 (5-12 μM; 2-24 h) dihydrochloride induces LDLR mRNA expression in sterol-fed HepG2 cells within 2 h through a mechanism that enhances transcription (rather than mRNA stabilization) and is independent of de novo protein synthesis[4].

MK-2206 (5-10 μM; 14 h) dihydrochloride upregulates LDLR protein levels in sterol-fed IHH, HeLa, IMH, and Hepac1c7 cells[4].

MK-2206 (5 μM; 24 h) dihydrochloride inhibits de novo cholesterol biosynthesis in HepG2 cells under sterol starvation conditions[4].

MK-2206 (5 μM; 14 h) dihydrochloride upregulates LDLR protein levels in CHO cells and HMGCR-deficient UT-2 cells, indicating that this effect is independent of HMGCR activity[4].

MK-2206 (0.5-4 μM; 38 h) dihydrochloride enhances the LDLR (low-density lipoprotein receptor)-inducing effect of Mevastatin (HY-17408) in sterol-starved HepG2 cells[4].

MK-2206 (5 μM; 2-24 h) dihydrochloride upregulates the mRNA expression of PCSK9, HMGCR, SREBP-2 and HMGCS1 in sterol-fed HepG2 cells, exerts only minor effects on ACACA, FASN and SCD1, and has no effect on IDOL[4].

MK-2206 (2.5-5 μM; 14-24 h) dihydrochloride stimulates LDLR promoter activity in sterol-fed HepG2 cells in an SRE-1-dependent manner[4].

MK-2206 (5 μM; 14-24 h) dihydrochloride upregulates LDLR mRNA levels in sterol-fed HepG2 cells in an SREBP-2-dependent manner[4].

MK-2206 (5 μM; 2-6 h) dihydrochloride stimulates proteolytic cleavage of FL-SREBP-2 to generate the active NTF-SREBP-2 in sterol-fed HepG2 cells[4].

MK-2206 (2.5-10 μM; 14 h) dihydrochloride upregulates LDLR protein levels in primary adult hepatocytes[4].

In Vivo

MK-2206 dihydrochloride enhances the anti-tumor efficacy of multiple chemotherapeutic agents in preclinical ovarian cancer xenograft models and induces mild, transient hyperglycemia and hyperinsulinemia in animals that resolves post-treatment[1].

MK-2206 (120 mg/kg; p.o.; alternate days; 4 total doses) dihydrochloride alleviates UUO-induced renal fibrosis in mice by reducing inflammation, inhibiting epithelial-mesenchymal transition, suppressing myofibroblast activation and extracellular matrix deposition, and blocking activation of the Akt/mTOR signaling pathway[3].

SOLUBILITY

Soluble in DMSO

REFERENCES

[1].Yan L. Abstract# DDT01-1: MK-2206: A potent oral allosteric AKT inhibitor. Cancer research. 2009 May 1;69(9_Supplement):DDT01-1.

[2].Lu JW, et al. MK-2206 induces apoptosis of AML cells and enhances the cytotoxicity of cytarabine. Med Oncol. 2015;32(7):206.

[3].Chen M, et al. MK-2206 Alleviates Renal Fibrosis by Suppressing the Akt/mTOR Signaling Pathway In Vivo and In Vitro. Cells. 2022;11(21):3505. Published 2022 Nov 5.

[4].Bjune K, et al. MK-2206, an allosteric inhibitor of AKT, stimulates LDLR expression and LDL uptake: A potential hypocholesterolemic agent. Atherosclerosis. 2018;276:28-38.