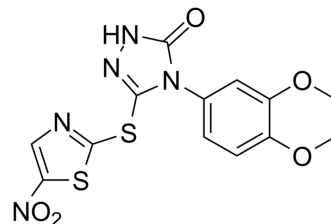


## BI-78D3

<b>Cat. No.:</b>	HY-10366		
<b>CAS No.:</b>	883065-90-5		
<b>Molecular Formula:</b>	C <sub>13</sub> H <sub>9</sub> N <sub>5</sub> O <sub>5</sub> S <sub>2</sub>		
<b>Molecular Weight:</b>	379.37		
<b>Target:</b>	JNK		
<b>Pathway:</b>	MAPK/ERK Pathway		
<b>Storage:</b>	Powder	-20°C	3 years
		4°C	2 years
	In solvent	-80°C	2 years
		-20°C	1 year



### SOLVENT & SOLUBILITY

<b>In Vitro</b>	DMSO : 100 mg/mL (263.59 mM; Need ultrasonic)				
		Solvent Concentration	Mass 1 mg	5 mg	10 mg
	<b>Preparing Stock Solutions</b>	1 mM	2.6359 mL	13.1797 mL	26.3595 mL
		5 mM	0.5272 mL	2.6359 mL	5.2719 mL
10 mM		0.2636 mL	1.3180 mL	2.6359 mL	
Please refer to the solubility information to select the appropriate solvent.					
<b>In Vivo</b>	1. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline Solubility: ≥ 2.5 mg/mL (6.59 mM); Clear solution  2. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline) Solubility: ≥ 2.5 mg/mL (6.59 mM); Clear solution				

### BIOLOGICAL ACTIVITY

<b>Description</b>	BI-78D3 functions as a substrate competitive inhibitor of JNK, inhibit the JNK kinase activity (IC <sub>50</sub> =280 nM).
<b>IC<sub>50</sub> &amp; Target</b>	JNK 280 nM (IC <sub>50</sub> )
<b>In Vitro</b>	BI-78D3, dose-dependently inhibits the phosphorylation of JNK substrates both in vitro and in cell. BI-78D3 is able to compete with the D-domain of JIP1 (amino acids 153-163; pepJIP1) for JNK1 binding (IC <sub>50</sub> =500 nM). Using the same in vitro LanthaScreen kinase assay and the same ATF2 substrate, BI-78D3 is found to be 100-fold less active vs. p38α, a member of the MAPK family with high structural similarity to JNK, and completely inactive against mTOR and PI3-kinase (α-isoform), both unrelated protein kinases. Furthermore, Lineweaver-Burk analysis clearly indicates that BI-78D3 is competitive with

ATF2 for binding to JNK1 with an apparent  $K_i$  value of 200 nM. In an attempt to profile the properties of BI-78D3 in the context of a complex cellular milieu, the cell-based LanthaScreen kinase assay is used. In this assay BI-78D3 is able to inhibit TNF- $\alpha$  stimulated phosphorylation of c-Jun in cell ( $EC_{50}=12.4 \mu\text{M}$ )<sup>[1]</sup>.

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

#### In Vivo

The link between ConA-induced liver failure, TNF receptor signaling, and JNK function has been established by studies employing JNK1<sup>-/-</sup> and JNK2<sup>-/-</sup> mice. For this analysis, insulin insensitive mice are injected only once with 25 mg/kg BI-78D3, 30 min before insulin injection. The effect of insulin on blood glucose levels is then measured. BI-78D3 results in a statistically significant reduction in blood glucose levels as compared with the vehicle control. Thus, the ability of BI-78D3 to abrogate ConA-induced liver damage and restore insulin sensitivity is consistent with its proposed function as an effective JNK inhibitor. Liquid chromatography/mass spectrometry bio-availability analysis demonstrates that BI-78D3 has favorable microsome and plasma stability ( $T_{1/2}=54 \text{ min}$ )<sup>[1]</sup>.

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## PROTOCOL

#### Kinase Assay <sup>[1]</sup>

The cell based kinase assays for c-Jun and ATF2 phosphorylation carry out by using the LanthaScreen c-Jun (1-79) HeLa and LanthaScreen ATF2 (19-106) A549 cell lines which stably express GFP-c-Jun 1-79 and GFP-ATF2 19-106, respectively. Phosphorylation is determined by measuring the time resolved FRET (TR-FRET) between a terbium labeled phospho-specific antibody and the GFP-fusion protein. The cells are plated in white tissue culture treated 384 well plates at a density of 10,000 cell per well in 32  $\mu\text{L}$  assay medium (supplemented with 1% charcoal/dextran-treated FBS, 100 U/mL Penicillin and 100  $\mu\text{g/mL}$  Streptomycin, 0.1 mM nonessential amino acids, 1 mM sodium pyruvate, 25 mM Hepes, pH 7.3, and lacking phenol red). After overnight incubation, cells are pretreated for 60 min with BI-78D3 (0.001, 0.01, 0.1, 1, 10, and 100  $\mu\text{M}$ ) followed by 30 min of stimulation with 2 ng/mL of TNF- $\alpha$  that stimulates both JNK and p38. The medium is then removed by aspiration and the cells are lysed by adding 20  $\mu\text{L}$  of lysis buffer (20 mM Tris-HCl, pH 7.6, 5 mM EDTA, 1% Nonidet P-40 substitute, 5 mM NaF, 150 mM NaCl, and 1:100 protease and phosphatase inhibitor mix, SIGMA P8340 and P2850, respectively). The lysis buffer includes 2 nM of the terbium-labeled anti-pc-Jun (pSer73) or anti-pATF2 (pThr71) detection antibodies. After allowing the assay to equilibrate for 1 h at room temperature, TR-FRET emission ratios are determined on a BMG Pherastar fluorescence plate reader (excitation at 340 nm, emission 520 nm and 490 nm; 100  $\mu\text{s}$  lag time, 200  $\mu\text{s}$  integration time, emission ratio=Em520/Em 490)<sup>[1]</sup>.

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#### Cell Assay <sup>[1]</sup>

Mice<sup>[1]</sup>

ConA and BI-78D3 is injected i.v. at 10 mg/kg into 6 to 8 weeks old male BL/6 mice. For partial hepatectomy, mice are anesthetized with isoflurane and subjected to midventral laparotomy followed by removal of the left lateral and median lobes. Animals are killed, blood is collected by cardiac puncture, and livers are surgically removed. Serum is separated and analyzed for alanine-aminotranferase levels<sup>[1]</sup>.

Eleven-week-old male BKS.Cg-+Lepr<sup>db/+</sup>Lepr<sup>db</sup>/OlaHsd db/db mice are randomized based on blood glucose levels acclimated three days before drug dosing. Blood glucose is read by using a hand-held glucose meter (Mice are fasted 6 h before i.p. (i.p.) administration of 25 mg/kg BI-78D3. Thirty minutes after test article administration, Bovine Insulin (I-0516 at 0.75 mg/kg) is administered via i.p. injection. Blood samples are taken at designated time points and blood glucose levels are measured as described. Food is returned three hours after test article administration<sup>[1]</sup>.

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## CUSTOMER VALIDATION

- Life Sci. 2020 Jul 15;253:117730.

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## REFERENCES

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[1]. Stebbins JL et al. Identification of a new JNK inhibitor targeting the JNK-JIP interaction site. Proc Natl Acad Sci U S A, 2008 Oct 28, 105(43):16809-13.

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

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