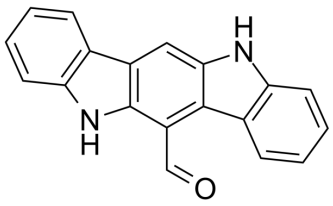
FICZ

Cat. No.:	HY-12451
CAS No.:	172922-91-7
Molecular Formula:	$C_{19}H_{12}N_2O$
Molecular Weight:	284.31
Target:	Aryl Hydrocarbon Receptor
Pathway:	Immunology/Inflammation
Storage:	Powder -20°C 3 years 4°C 2 years In solvent -80°C 6 months -20°C 1 month



SOLVENT & SOLUBILITY

In Vitro

DMSO : 10 mg/mL (35.17 mM; Need ultrasonic and warming)

Preparing Stock Solutions

Concentration \ Solvent \ Mass	1 mg	5 mg	10 mg
1 mM	3.5173 mL	17.5864 mL	35.1729 mL
5 mM	0.7035 mL	3.5173 mL	7.0346 mL
10 mM	0.3517 mL	1.7586 mL	3.5173 mL

Please refer to the solubility information to select the appropriate solvent.

In Vivo

1. Add each solvent one by one: 15% Solutol HS 15 >> 10% Cremophor EL >> 35% PEG 400 >> 40% water
   Solubility: 3.33 mg/mL (11.71 mM); Suspended solution; Need ultrasonic
2. Add each solvent one by one: 5% DMSO >> 40% PEG300 >> 5% Tween-80 >> 50% saline
   Solubility: 1.11 mg/mL (3.90 mM); Suspended solution; Need ultrasonic
3. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 0.83 mg/mL (2.92 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

FICZ is a potent aryl hydrocarbon receptor (AhR) agonist with a K_d of 70 pM.

In Vitro

FICZ (0.01 nM-1 μM) alone or in combination with 50 nM MNF induces sustained CYP1A1 activity and leads to oxidative stress and activation of apoptosis via a mitochondrial-dependent pathway. In HepG2 cells, FICZ stimulates cell growth at low concentrations but inhibits cell growth at high concentrations[1]. FICZ (10,000-30,000 nM) significantly decreases CEH viability with an estimated LC_{50} (95% confidence intervals) of 14,000 nM. FICZ shows concentration-dependent effects on EROD activity in CEH cultures, with the mean EC_{50} values at 3, 8, and 24 h of 0.016 nM, 0.80 nM, and 11 nM, respectively[2]. FICZ treatment increases transcript expression of CYP1A1 in a dose-dependent manner in both the parental iPSC line and

the CYP1A1 targeted clone[3]. CYP1 inhibition in the presence of FICZ results in enhanced AHR activation, suggesting that FICZ accumulates in the cell when its metabolism is blocked. CYP1 enzymes plays a role in regulating biological effects of FICZ[4].

Nuclear export and degradation of the AHR protein are two additional steps in the AHR-mediated signal transduction pathway[5].

Exposure to AhR agonists causes AhR-expressing cells to downregulate the receptor through the ubiquitin/proteasome degradation pathway[6].

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

PROTOCOL

Cell Assay [2]

The cell viability of CEH treated with FICZ or TCDD is studied with the untreated cells (used as a live cell control) and sodium hypochlorite (5%)-treated cells (used as a dead cell control). This assay is based upon the bioluminescent measurement of adenosine triphosphate (ATP) that is present in all metabolically active cells. Luciferase is utilized in this method to catalyze the formation of light from ATP and luciferin. CEH are lysed 24 h after dosing and the luminescence emitted from the ATP-dependent oxidation of luciferin is measured with a LuminoSkan Ascent luminometer.

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

CUSTOMER VALIDATION

- Cell Rep Med. 2023 Mar 21;4(3):100979.
- Theranostics. 2021; 11(18):8797-8812.
- Theranostics. 2020 Oct 25;10(26):12011-12025.
- Gut Microbes. 2023 Jan-Dec;15(1):2221485.
- EMBO Mol Med. 2022 Oct 28;e15677.

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REFERENCES

[1]. Mohammadi-Bardbori A, et al. The highly bioactive molecule and signal substance 6-formylindolo[3,2-b]carbazole (FICZ) plays bi-functional roles in cell growth and apoptosis in vitro. Arch Toxicol. 2017 Mar 13

[2]. Farmahin R, et al. Time-dependent transcriptomic and biochemical responses of 6-formylindolo[3,2-b]carbazole (FICZ) and 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) are explained by AHR activation time. Biochem Pharmacol. 2016 Sep 1;115:134-43

[3]. Smith BW, et al. Genome Editing of the CYP1A1 Locus in iPSCs as a Platform to Map AHR Expression throughout Human Development. Stem Cells Int. 2016;2016:2574152.

[4]. Wincent E, et al. Biological effects of 6-formylindolo[3,2-b]carbazole (FICZ) in vivo are enhanced by loss of CYP1A function in an Ahr2-dependent manner. Biochem Pharmacol. 2016 Jun 15;110-111:117-29.

[5]. N A Davarinos, et al. Aryl Hydrocarbon Receptor Imported Into the Nucleus Following Ligand Binding Is Rapidly Degraded via the Cytosplasmic Proteasome Following Nuclear Export. J Biol Chem. 1999 Oct 1;274(40):28708-15.

[6]. Riccardo Sibilano, et al. The Aryl Hydrocarbon Receptor Modulates Acute and Late Mast Cell Responses. J Immunol. 2012 Jul 1;189(1):120-7.

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

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