Benzo[a]pyrene

Cat. No.: HY-107377

CAS No.: 50-32-8

Molecular Formula: $C_{20}H_{12}$

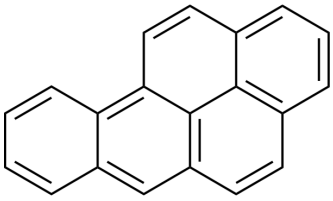
Molecular Weight: 252.31

Target: Endogenous Metabolite

Pathway: Metabolic Enzyme/Protease

Storage:

Powder	-20°C	3 years
	4°C	2 years
In solvent	-80°C	2 years
	-20°C	1 year



SOLVENT & SOLUBILITY

In Vitro

DMSO : ≥ 25 mg/mL (99.08 mM)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	3.9634 mL	19.8169 mL	39.6338 mL
5 mM	0.7927 mL	3.9634 mL	7.9268 mL
10 mM	0.3963 mL	1.9817 mL	3.9634 mL

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

In Vivo

1. Add each solvent one by one: 1% CMC-Na/saline water
   Solubility: 5 mg/mL (19.82 mM); Suspended solution; Need ultrasonic and warming and heat to 50°C
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 1.67 mg/mL (6.62 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: 1.67 mg/mL (6.62 mM); Suspended solution; Need ultrasonic
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 1.67 mg/mL (6.62 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Benzo[a]pyrene shows lung carcinogenicity in animal models, and it is frequently used in chemoprevention studies.

In Vivo

Statistically significant decrease is observed at 7 weeks in females receiving 1.0 mg Benzo[a]pyrene (B[a]P) compare with the vehicle group. As lung tumorigenesis induced by Benzo[a]pyrene is dose dependent in female A/J mice. The incidence of

hyperplasia values in females treating with 0.25, 0.50, and 1.0 mg Benzo[a]pyrene are significantly higher than in the vehicle-treated group. The incidence of adenoma in females receiving 1.0 mg Benzo[a]pyrene is significantly higher than in the vehicle group. The multiplicity of hyperplasia in females receiving 0.50 or 1.0 mg Benzo[a]pyrene is significantly higher than in the vehicle group. The multiplicity of adenoma in the group treated with 1.0 mg is also significantly higher than in the vehicle group. The incidences of hyperplasia and adenoma in female A/J mice are significantly increased by Benzo[a]pyrene in a dose-dependent manner[1].

Benzo[a]pyrene induces an average of 9.38±1.75 tumors with an average tumor load of 19.53±3.81 mm^3 ($P<0.05$ compare to control). Benzo[a]pyrene administration significantly ($P<0.05$) decreases cAMP levels in tumors with adjacent lung tissues. The expression level of PDE4D gene is also increased by Benzo[a]pyrene administration[2].

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

PROTOCOL

Animal Administration [2]

Female A/J mice are randomized into eight groups (n=8): (i) control; (ii)Benzo[a]pyrene (B(a)P)+vehicle (methocel); (iii) Benzo[a]pyrene+roflumilast 1 mg/kg; (iv) Benzo[a]pyrene+roflumilast 5 mg/kg; (v) Benzo[a]pyrene+aerozolie phosphate-buffer saline (PBS); (vi) Benzo[a]pyrene+aerosolize budesonide 2.25 mg/mL; (vii) Benzo[a]pyrene+aerosolized budesonide 2.25 mg/mL+roflumilast 1 mg/kg; and (viii) Benzo[a]pyrene+aerosolize budesonide 2.25 mg/mL+roflumilast 5 mg/kg groups. A single dose of Benzo[a]pyrene in corn oil is given intraperitoneally once at 100 mg/kg body weight. Roflumilast (1 or 5 mg/kg) is started 2 weeks after Benzo[a]pyrene. It is continued for 26 weeks (3 days/week) via oral gavage. Mice in the Benzo[a]pyrene+vehicle group are treated with an equal volume of methocel as solvent control. Aerosolizing budesonide is administrated by inhaling route as an aerosol at a dose of 2.25 mg/mL for 2 min per application at 2 weeks after Benzo[a]pyrene. It is continued for 26 weeks (5 days/week). PBS is also used as solvent control by inhaling route after Benzo[a]pyrene administration in the Benzo[a]pyrene+PBS group. Mice are killed at 28 weeks after exposure to Benzo[a]pyrene. Their lungs are excised and stored at -70 °C[2].

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CUSTOMER VALIDATION

- Cancer Cell Int. 2024 Jan 17;24(1):33.
- Neurotoxicology. 2021 Jul 14;S0161-813X(21)00081-4.
- Research Square Preprint. 2022 Feb.

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REFERENCES

[1]. Foth H, et al. Pharmacokinetics of low doses of benzo [a] pyrene in the rat[J]. Food and chemical toxicology, 1988, 26(1): 45-51.

[2]. Anandakumar P, et al. Capsaicin inhibits benzo(a)pyrene-induced lung carcinogenesis in an in vivo mouse model. Inflamm Res. 2012 Nov;61(11):1169-75.

[3]. Kasala ER, et al. Benzo(a)pyrene induced lung cancer: Role of dietary phytochemicals in chemoprevention. Pharmacol Rep. 2015 Oct;67(5):996-1009.

[4]. Saeko Onami, et al. Dosimetry for lung tumorigenesis induced by urethane, 4-(N-methyl-N-nitrosamino)-1-(3-pyridyl)-1-butanone (NNK), and benzo[a]pyrene (B[a]P) in A/JJmsSlc mice. J Toxicol Pathol. 2017 Jul; 30(3): 209–216.

[5]. Yeo CD, et al. Roflumilast treatment inhibits lung carcinogenesis in benzo(a)pyrene-induced murine lung cancer model. Eur J Pharmacol. 2017 Oct 5;812:189-

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

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