

Product Data Sheet

Product Name: Benzo[a]pyrene (3,4-Benzopyrene)

Cat. No.: GC32985

Chemical Properties

Cas. No. 50-32-8

SMILES C12=C(C=C3)C=C(C=CC=C4)C4=C1C=CC5=CC=CC3=C25

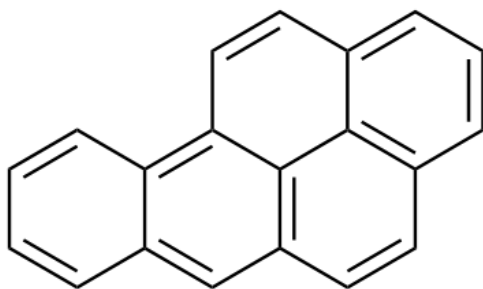
Formula $C_{20}H_{12}$ M.Wt 252.31

Solubility DMSO : 50 mg/mL (198.17 mM) 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 human CD14+ monocytes

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

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Cells were cultured in complete RPMI 1640 supplemented with or without benzo(a)pyrene, Benzo[a]pyrene (3,4-Benzopyrene) (1, 5 or 10 μ M) and M-CSF Preparation Method (50U/mL) for 6 days. After 6 days the cells were washed, incubated with 1mg/mL FITC-dextran for 1h at 37°C. Cellular uptake of FITC-dextran was monitored by flow cytometry.

Reaction
Conditions 1,5, 10 μ M; up to 6 days

Applications Exposure of macrophages to Benzo[a]pyrene (3,4-Benzopyrene) alters their lipid raft integrity by decreasing membrane cholesterol 25% while increasing CD32 into non-lipid raft fractions.

Animal experiment [2]:

Animal models Eight-week-old female Slc : SD rats

Preparation Method One group of rats was treated with Benzo[a]pyrene (3,4-Benzopyrene)(BaP) alone and another with Benzo[a]pyrene (3,4-Benzopyrene) with phenanthrene (PH) and pyrene (PY) simultaneously given by oral gavage once per day for 30 days at a volume of 2ml/kg and maintained for another three weeks after withdrawal. Muscle, fat, blood, liver and urine samples were collected every 10 days during treatment and every 7 days after withdrawal of the treatment.

Dosage form 150 μ g/kg; once per day for 30 days; oral gavage

Applications 7-ethoxyresorufin-O-deethylase activity in liver microsomal fraction was increased in only Benzo[a]pyrene (3,4-Benzopyrene) groups

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References:

- [1] Clark, Ryan S et al. "Validation of research trajectory 1 of an Exposome framework: Exposure to benzo(a)pyrene confers enhanced susceptibility to bacterial infection." *Environmental research* vol. 146 (2016): 173-84. doi:10.1016/j.envres.2015.12.027
- [2]. Kang, Hwan Goo et al. "Changes of biomarkers with oral exposure to benzo(a)pyrene, phenanthrene and pyrene in rats." *Journal of veterinary science* vol. 8,4 (2007): 361-8. doi:10.4142/jvs.2007.8.4.361

Background

Benzo[a]pyrene (3,4-Benzopyrene) (BaP, B[a]P) is a polycyclic aromatic hydrocarbon formed by a benzene ring fused to pyrene^[1]. The diol epoxide metabolites of Benzo[a]pyrene (3,4-Benzopyrene), BPDE, react with and bind to DNA, resulting in mutations and carcinogenesis^[2]. Benzo[a]pyrene (3,4-Benzopyrene) has toxicity on the nervous system, immune system, reproductive system, and carcinogenicity^[3].

In vitro Benzo[a]pyrene (3,4-Benzopyrene) (0.2µg/ml; 24h) induces the transformation of human mammary epithelial cells^[4]. Benzo[a]pyrene (3,4-Benzopyrene) (1,5, 10µM; up to 6 days) also confers enhanced susceptibility to bacterial infection^[5]. The carcinogenesis caused by Benzo[a]pyrene (3,4-Benzopyrene) (0.05-500µg/ml; 24h) can be restored by isoflavone biochanin A^[6].

In vivo Benzo[a]pyrene (3,4-Benzopyrene) (300µg/kg; 3 days; oral gavage) results in diminished mRNA expression of the NMDA NR2B receptor subunit to resulting in late-life deficits in cortical neuronal activity in the offspring^[7]. Benzo[a]pyrene (3,4-Benzopyrene) (150µg/kg; once per day for 30 days; oral gavage) also increases 7-ethoxyresorufin-O-deethylase activity in liver microsomal fraction^[8].

References:

- [1] Bukowska, Bożena et al. "Benzo[*a*]pyrene-Environmental Occurrence, Human Exposure, and Mechanisms of Toxicity." **International journal of molecular sciences** vol. 23,11 6348. 6 Jun. 2022, doi:10.3390/ijms23116348

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- [2] Matter, Brock et al. "Formation of diastereomeric benzo[a]pyrene diol epoxide-guanine adducts in p53 gene-derived DNA sequences." *Chemical research in toxicology* vol. 17,6 (2004): 731-41. doi:10.1021/tx049974l
- [3] Fu, Chenghao et al. "Benzo(a)pyrene and cardiovascular diseases: An overview of pre-clinical studies focused on the underlying molecular mechanism." *Frontiers in nutrition* vol. 9 978475. 4 Aug. 2022, doi:10.3389/fnut.2022.978475
- [4] Stampfer, M R, and J C Bartley. "Induction of transformation and continuous cell lines from normal human mammary epithelial cells after exposure to benzo[a]pyrene." *Proceedings of the National Academy of Sciences of the United States of America* vol. 82,8 (1985): 2394-8. doi:10.1073/pnas.82.8.2394
- [5] Clark, Ryan S et al. "Validation of research trajectory 1 of an Exposome framework: Exposure to benzo(a)pyrene confers enhanced susceptibility to bacterial infection." *Environmental research* vol. 146 (2016): 173-84. doi:10.1016/j.envres.2015.12.027
- [6] Cassady, J M et al. "Use of a mammalian cell culture benzo(a)pyrene metabolism assay for the detection of potential anticarcinogens from natural products: inhibition of metabolism by biochanin A, an isoflavone from Trifolium pratense L." *Cancer research* vol. 48,22 (1988): 6257-61.
- [7] McCallister, Monique M et al. "Prenatal exposure to benzo(a)pyrene impairs later-life cortical neuronal function." *Neurotoxicology* vol. 29,5 (2008): 846-54. doi:10.1016/j.neuro.2008.07.008
- [8] Kang, Hwan Goo et al. "Changes of biomarkers with oral exposure to benzo(a)pyrene, phenanthrene and pyrene in rats." *Journal of veterinary science* vol. 8,4 (2007): 361-8. doi:10.4142/jvs.2007.8.4.361

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