

BPDE-DNA (5D11): sc-52625

BACKGROUND

Benzo[a]pyrene-7,8-diol-9,10-epoxide (BPDE) is a five-ring polycyclic aromatic hydrocarbon that is mutagenic and highly carcinogenic. BPDE is a product of incomplete combustion found in coal tar, automobile exhaust fumes, tobacco smoke, and in charbroiled food. BPDE is first activated by cytochrome P4501A1 to form + -benzo[a]pyrene 7,8-oxide which is then metabolized by epoxide hydrolase to yield (-)-benzo[a]pyrene-7,8-dihydrodiol. This product forms the ultimate carcinogen after reacting with cytochrome P4501A1 to yield benzo[a]pyrene diol epoxide. The two carbons of the epoxide are electrophilic, and this molecule intercalates and distorts DNA, covalently bonding to the nucleophilic guanine nucleobases at the N2 position. BPDE causes an increased number of micronuclei and apoptosis in cells and eventually causes many types of cancer, especially lung.

REFERENCES

1. Santella, R.M., et al. 1984. Monoclonal antibodies to DNA modified by a benzo[a]pyrene diol epoxide. *Carcinogenesis* 5: 373-377.
2. Yamato, I. 1992. Membrane assembly of lactose permease of *Escherichia coli*. *J. Biochem.* 111: 444-450.
3. Mumford, J.L., et al. 1996. A sensitive color ELISA for detecting polycyclic aromatic hydrocarbon-DNA adducts in human tissues. *Mutat. Res.* 359: 171-177.
4. Santella, R.M., et al. 2000. Immunohistochemical analysis of polycyclic aromatic hydrocarbon-DNA adducts in breast tumor tissue. *Cancer Lett.* 154: 143-149.
5. Lodovici, M., et al. 2004. Benzo(a)pyrene diolepoxide (BPDE)-DNA adduct levels in leukocytes of smokers in relation to polymorphism of CYP1A1, GSTM1, GSTP1, GSTT1, and mEH. *Cancer Epidemiol. Biomarkers Prev.* 13: 1342-1348.

SOURCE

BPDE-DNA (5D11) is a mouse monoclonal antibody raised against BPDE-I-G.

PRODUCT

Each vial contains 200 µg IgG_{2a} kappa light chain in 1.0 ml of PBS with < 0.1% sodium azide and 0.1% gelatin.

BPDE-DNA (5D11) is available conjugated to agarose (sc-52625 AC), 500 µg/0.25 ml agarose in 1 ml, for IP; to HRP (sc-52625 HRP), 200 µg/ml, for WB, IHC(P) and ELISA; to either phycoerythrin (sc-52625 PE), fluorescein (sc-52625 FITC), Alexa Fluor[®] 488 (sc-52625 AF488), Alexa Fluor[®] 546 (sc-52625 AF546), Alexa Fluor[®] 594 (sc-52625 AF594) or Alexa Fluor[®] 647 (sc-52625 AF647), 200 µg/ml, for WB (RGB), IF, IHC(P) and FCM; and to either Alexa Fluor[®] 680 (sc-52625 AF680) or Alexa Fluor[®] 790 (sc-52625 AF790), 200 µg/ml, for Near-Infrared (NIR) WB, IF and FCM.

Alexa Fluor[®] is a trademark of Molecular Probes, Inc., Oregon, USA

STORAGE

Store at 4° C, **DO NOT FREEZE**. Stable for one year from the date of shipment. Non-hazardous. No MSDS required.

APPLICATIONS

BPDE-DNA (5D11) is recommended for detection of BPDE-DNA by immunofluorescence (starting dilution 1:50, dilution range 1:50-1:500) and immunohistochemistry (including paraffin-embedded sections) (starting dilution 1:50, dilution range 1:50-1:500).

RECOMMENDED SUPPORT REAGENTS

To ensure optimal results, the following support reagents are recommended: 1) Immunofluorescence: use m-IgGκ BP-FITC: sc-516140 or m-IgGκ BP-PE: sc-516141 (dilution range: 1:50-1:200) with UltraCruz[®] Mounting Medium: sc-24941 or UltraCruz[®] Hard-set Mounting Medium: sc-359850. 2) Immunohistochemistry: use m-IgGκ BP-HRP: sc-516102 with DAB, 50X: sc-24982 and Immunohistomount: sc-45086, or Organo/Limonene Mount: sc-45087.

SELECT PRODUCT CITATIONS

1. Gu, A., et al. 2010. Nucleotide excision repair polymorphisms, polycyclic aromatic hydrocarbon exposure, and their effects on sperm deoxyribonucleic acid damage and male factor infertility. *Fertil. Steril.* 94: 2620-2625.
2. Ji, G., et al. 2010. Interactions between exposure to environmental polycyclic aromatic hydrocarbons and DNA repair gene polymorphisms on bulky DNA adducts in human sperm. *PLoS ONE* 5: e13145.
3. Gu, A., et al. 2011. Assessment of an association between an aryl hydrocarbon receptor gene (AHR) polymorphism and risk of male infertility. *Toxicol. Sci.* 122: 415-421.
4. Perrin, J., et al. 2011. Tobacco consumption and benzo(a)pyrene-diol-epoxide-DNA adducts in spermatozoa: in smokers, swim-up procedure selects spermatozoa with decreased DNA damage. *Fertil. Steril.* 95: 2013-2017.
5. Gu, A., et al. 2012. Contributions of aryl hydrocarbon receptor genetic variants to the risk of glioma and PAH-DNA adducts. *Toxicol. Sci.* 128: 357-364.
6. Ji, G., et al. 2013. Bulky DNA adducts in human sperm associated with semen parameters and sperm DNA fragmentation in infertile men: a cross-sectional study. *Environ. Health* 12: 82.
7. Einaudi, L., et al. 2014. *In vivo* exposure to benzo(a)pyrene induces significant DNA damage in mouse oocytes and cumulus cells. *Hum. Reprod.* 29: 548-554.
8. Wang, F., et al. 2016. RASSF10 is an epigenetically inactivated tumor suppressor and independent prognostic factor in hepatocellular carcinoma. *Oncotarget* 7: 4279-4297.
9. Christmann, M., et al. 2016. Adaptive upregulation of DNA repair genes following benzo(a)pyrene diol epoxide protects against cell death at the expense of mutations. *Nucleic Acids Res.* 44: 10727-10743.
10. Gu, Q., et al. 2021. Effect of EGCG on bronchial epithelial cell premalignant lesions induced by cigarette smoke and on its CYP1A1 expression. *Int. J. Mol. Med.* 48: 220.

RESEARCH USE

For research use only, not for use in diagnostic procedures.