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Data Article

Mutational analysis of pentabrominated diphenyl-induced hepatocellular tumors in rats and mice, tissue levels of PBDE congeners in rats and mice, and AhR genotyping of Wistar Han rats

June K. Dunnick [a,*], Arun R. Pandiri [a], B.A. Merrick [a], Grace E. Kissling [a], Helen Cunny [a], Esra Mutlu [a], Suramya Waidyanatha [a], Robert C. Sills [a], Hue-Hua. L. Hong [a], Thai-Vu Ton [a], Timonthy Maynor [b], Leslie Rescio [b], Siuzanne L. Phillips [b], Michael J. Devito [a], Amy Brix [c]

[a] National Toxicology Program, National Institute of Environmental Health Sciences, Research Triangle Park, NC 27709, United States
[b] Integrated Laboratory Systems, Research Triangle Park, NC 27709, United States
[c] EPL, Inc., Research Triangle Park, NC 27709, United States

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ABSTRACT

This article describes data related to the research article entitled "Carcinogenic activity of pentabrominated diphenyl ether mixture (DE-71) in rats and mice" (Dunnick et al., 2018). PBDE-induced hepatocellular tumors harbored *Hras* and *Ctnnb1* mutations and the methods for these studies are provided. Tissue levels of PBDE congeners in rats and mice after oral exposure to PBDE mixture increased with increasing dose of PBDE. There was no correlation between AhR status and the incidence of hepatocellular tumors in female Wistar Han rats. This manuscript provides additional information on the methods for conducting mutational analysis, PBDE tissue level determinations, and AhR genotyping.

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* Corresponding author.
E-mail address: dunnickj@niehs.nih.gov (J.K. Dunnick).

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Specifications table

Subject area	*Genotyping, Mutation Analysis, Chemistry*
More specific subject area	*Hras and Ctnnb1 mutations, PBDE tissue levels, AhR genotype*
Type of data	*Genotying, Mutational Analysis, Concentration of PBDE congeners in tissues*
How data was acquired	*qPCR and Sanger sequencing; gas chromatography, electron capture detector*
Data format	*Analyzed*
Experimental factors	*Samples taken from animals treated with pentabrominated diphenyl ether mixture (DE-71)*
Experimental features	*Hras and Ctnnb1 analysis of liver tumors; PBDE congener tissue levels, AhR genotyping;*
Data source location	*N/A*
Data accessibility	*Data provided for this article are in the supplements*

Value of the data

- These data show that *Hras* and *Ctnnb1* mutations occurred in PBDE-induced liver tumors.
- Formation of PBDE-induced tumors were related to PBDE congener tissue level.
- Wistar Han rats were genotyped as either wild type, heterozygous, or mutant AhR. There was no correlation found between AhR genotype and the occurrence of PBDE-induced liver tumors in Wistar Han rats.

1. Data

This article contains information and methods for mutational analysis of PBDE-induced tumors (Supplement 1); data on PBDE-tissue levels in rats and mice after oral administration of PBDE (Supplement 2); and methods for AhR genotyping of Wistar Han rats (Supplement 3).

1.1. Mutation analysis of PBDE-induced liver tumors

Hras and C*tnnb1* mutations were noted in PBDE-induced tumors. These data allow comparison of molecular changes in these genes to changes found in spontaneous rodent liver tumors or other chemical-induced rodent liver tumors.

1.2. PBDE congener tissue levels at two years after oral administration of PBDE

PBDE-47, 99, and 153 levels were determined in liver, fat, and plasma of male and female rats and in liver and fat of male mice (except for 30 mg/kg group) and female mice using validated analytical methods.

1.3. AhR genotyping of Wistar Han rats

Data are provided to characterize the AhR genotype of Wistar Han rats used in toxicology studies of pentabrominated diphenyl ether mixture [1]. The AhR genotyping results showed that PBDE-induced liver tumors occurred independently of a mutant or wild type AhR genotype.

2. Experimental design, materials and method

Male and female Wistar Han rats were dosed with PBDE mixture (DE-71) (0, 3, 15 or 50 mg/kg) by oral gavage during gestation, postnatally, and from postnatal day 21 to 2 years. Male and female B6C3F1/N mice were dosed with PBDE mixture (DE-71) (0, 3, 30, or 100 mg/kg) by oral gavage from week 5–6 to 2 years. At 2-years the occurrence of liver tumors was diagnosed by histopathology. Samples of liver tumors were collected for mutation analysis by Sanger sequencing. Samples of liver, fat and/or plasma were taken for PBDE congener tissue level determinations. Liver tissue samples from control or treated female rats were collected for DNA extraction and AhR genotyping [1].

3. Materials and methods

3.1. Mutation analysis

Treatment-related liver tumors were seen in rats and mice after exposure to PBDE mixture (DE-71). The *Hras* and *Ctnnb1* mutations helped to define the unique nature of the PBDE mixture induced liver tumors. The methods for the conduct of these mutational analysis are provided in Supplement 1.

3.2. PBDE tissue levels

PBDE-47, 99, and 153 levels were determined in liver, fat, and plasma of male and female rats and in liver and fat of male (except for 30 mg/kg) and female mice using validated analytical methods. Lipid levels in liver and adipose in male and female rats were determined following extraction with chloroform:methanol (1:1, v/v), hydrolysis with acid, reaction with vanillin reagent followed by detection at 490 nm to allow reporting tissue levels as μg/g lipid in the tissue. There were 4 to 15 tissue samples available per dose level/sex/species. The data and detailed methods for these PBDE tissue level determinations are provided in Supplement 2.

3.3. AhR genotyping

The methods for the AhR genotyping of female rat liver tumor are described in Supplement 3A and the detailed results are in Supplement 3B. This includes methods for the development of plasmid controls to generate AhR DNA, AhR wild and mutant nucleotide sequence, and other details on the AhR genotyping of female Sprague Dawley rats. These data were used in the original paper [1] to determine if the occurrence of PBDE induced liver tumors were related to the AhR genotype.

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Transparency document. Supporting information

Transparency data associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2018.10.104.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2018.10.104.

Reference

[1] J.K. Dunnick, A.R. Pandiri, B.A. Merrick, G.E. Kissling, H. Cunny, E. Mutlu, S. Waidyanatha, R. Sills, H.L. Hong, T.V. Ton, T. Maynor, L. Recio, S.L. Phillips, M.J. Devito, A. Brix, Carcinogenic activity of pentabrominated diphenyl ether mixture (DE-71) in rats and mice, Toxicol. Rep. 5 (2018) 615–624.