

# 大気浮遊粒子状物質の内分泌攪乱作用とその本体

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# 2002 Fiscal Year Final Research Report Summary

## Endocrine Disrupting Effects of Airborne Particle Matter and Their Responsible Constituents

Research Project

### Project/Area Number

13672342

### Research Category

Grant-in-Aid for Scientific Research (C)

### Allocation Type

Single-year Grants

### Section

一般

### Research Field

Environmental pharmacy

### Research Institution

Kanazawa University

### Principal Investigator

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### Project Period (FY)

2001 - 2002

### Keywords

airborne suspended particulate matter / antiestrogenic effect / antiandrogenic effect / antagonist / aryl hydrocarbon receptor / polycyclic aromatic hydrocarbon / MCF-7 cell / PC3 cell

### Research Abstract


There is an increasing environmental concern on exogenous chemicals that exhibit adverse effects on endocrine systems of human and wild life, so-called endocrine disrupting substances. Endocrine disrupting effects of airborne suspended particulate matter (SPM) has also attracted much attention. Therefore, we collected SPM in Kanazawa, Ishikawa, and Sapporo, Hokkaido, at April, July, October and January. Then, we assayed their endocrine disrupting effects in cultured human-originated cell lines and investigated the responsible constituents. The results obtained are described below. 1. Every SPM samples exhibited the antiestrogenic and antiandrogenic effects. 2. At both Kanazawa and Sapporo, SPM samples showed greater effect in winter than in summer. This was considered to be due to increased energy consumption


in winter compared with that in summer. 3. The endocrine disrupting effects of SPM samples were reduced when the cells were treated with SPM samples in combination with an aryl hydrocarbon receptor (AhR) agonist. This results indicated that the endocrine disrupting effects were due in part to constituents acting as an AhR agonists. 4. Since polycyclic aromatic hydrocarbons (PAHs) are typical AhR agonists in environment, several PAHs were determined for their concentration in SPM samples and assayed for their endocrine disrupting effects. The results revealed that the endocrine disrupting effects of SPM samples are based in part on PAHs. 5. Competitive hormone receptor binding assay and yeast two-hybrid assay revealed that SPM samples contains the constituents capable to bind to estrogen receptor or androgen receptor as antagonists.


## Research Products (13 results)


All Other


All Publications


[Publications] Ryoichi Kizu: "A Role of Aryl Hydrocarbon Receptor in the Antiandrogenic Effects of Polycyclic Aromatic Hydrocarbons in LNCaP Human Prostate Carcinoma Cells"Archives of Toxicology. 77(in press). (2003) 

[Publications] Ning Tang: "Improvement of an Authentic HPLC System for Nitropolycyclic Aromatic Hydrocarbons : Removal of an Interfering Peak and Increasing in the Number of Analytes"Analytical Science. 19. 249-253 (2003) 


[Publications] Akira Toriba: "Method for Determining Monohydroxybenzo[a]pyrene Isomers Using Column-switching High-Performance Liquid Chromatography"Analytical Biochemistry. 312. 14-22 (2003) 


[Publications] Kazuichi Hayakawa: "Comparison of Polycyclic Aromatic Hydrocarbons and Nitropolycyclic Aromatic Hydrocarbons in Airborne Particulates Collected in Downtown and Suburban Kanazawa, Japan"Atmospheric Environment. 36. 5535-5541 (2002) 


[Publications] Hideki Sasaki: "Simultaneous Determination of Monohydroxybenzo[a]pyrene Positional Isomers by Reversed Phase Liquid Chromatography Connected Online to Electrospray Ionization Mass Spectrometry"Biomedical Chromatography. 16. 432-436 (2002) 


[Publications] Kazumasa Okamura: "Antiestrogenic Activity of Extracts of Diesel Exhaust Particulate Matter in MCF-7 Breast Carcinoma cells"Polycyclic Aromatic Compounds. 22. 747-759 (2002) 


[Publications] 木津 良一: "機器分析化学"丸善. 155 (2002) 


[Publications] Ryoichi Kizu: "A Role of Aryl Hydrocarbon Receptor in the Antiandrogenic Effects of Polycyclic Aromatic Hydrocarbons in LNCaP Human Prostate Carcinoma Cells"Archives of Toxicology. 77,in press.. (2003) 

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