

PBDE LEVELS IN ITALIAN NULLIPAROUS WOMEN OF REPRODUCTIVE AGE

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Introduction

The human exposure to persistent organic pollutants (POPs) has been associated to potential endocrine disruption and reproductive toxicity even at background levels of exposure¹. In order to carry out a sound human risk assessment with respect to the different toxicological endpoints, data on exposure are needed. Data on POP levels in human tissues, considered to be the most appropriate exposure estimate for risk assessment, are in general scarce². In particular, data on human levels of polybrominated dipheyl ethers (PBDEs) in the Italian population are lacking.

Here we present some preliminary results of a study carried out within the framework of an ongoing project funded by the Italian National Health System, aimed to assess the levels of a number of POPs with known or suspected activity of endocrine disrupters, in nulliparous women of reproductive age as a function of reproductive disorders. While the complete dataset is at present under elaboration, here we report our findings on PBDE levels in a group of Italian women of reproductive age, with and without endometriosis, living in Rome. In this study, no significant differences were found in PBDE body burdens between healthy women and women affected by endometriosis although the limited number of cases does not allow to draw a definitive conclusion.

Methods and Materials

Patients. Twenty-two Italian nulliparous women, aged 18 to 40 years, undergoing laparoscopy for endometriosis or tubal infertility, were enrolled in the study. The women were selected in the Institute of Gynecological Sciences, Perinatology and Child Health, University "La Sapienza" in Rome (Italy) during the period April 2000 to January 2001. Selection criteria were: nulliparity; absence of endocrine, immunologic, or other chronic diseases; absence of an ascertained professional exposure to environmental contaminants; birth and residence in Rome. All women signed a written informed consent to the study. A questionnaire documented age, education, job, medical, gynecological and obstetrical history, height and weight, known exposure to organochlorine compounds, frequency and amount of every kind of food per week, alcohol and smoking habits, and education. A blood specimen of approximately 30 mL was collected from cubital vein of each woman in vacutainer tubes containing heparine; specimens were stored at -20 °C until subjected to analytical processing.

Pooling of specimen. Patients were divided into groups according to the presence or the absence of endometriosis. Twelve women had endometriosis, whereas the remaining 10 subjects had no laparoscopic evidence of endometriosis. Individual specimens were pooled to yield three blood samples as follows: Pool A (10 controls), and Pool B and Pool C (12 cases, six each pool). To obtain pools, the frozen specimens were first allowed to thaw out in the laboratory; then, equal

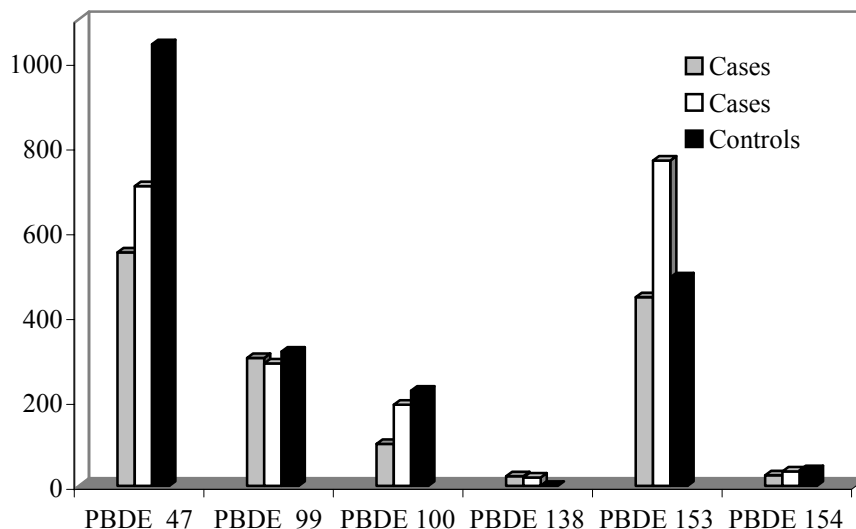
amounts of blood from six to 10 individuals were combined together according to the scheme devised. As dioxin body burden was shown to be age-dependent³ pools reflect grouping of patients with a similar age distribution (18–40 years).

Analysis. The analytical procedure has been described in detail elsewhere⁴. In general, all analyses were performed following the isotope dilution method by applying six internal ¹³C-labeled and 12 native standards. The procedure included a liquid/liquid extraction with appropriate organic solvents, and gravimetric lipid determination followed by a sophisticated clean up. The final measurements applied high resolution gas chromatography combined with high resolution mass spectrometry (HRMS-HRGC(SIM)). All measurements were performed on a 30-m DB-5 column. Analytical reliability was specifically warranted by the assay of frequent blind replicates, blanks, and appropriate quality control pools of human milk.

Results and Discussion

The PBDE congeners T₃BDE-17, T₃BDE-28, T₄BDE-47, T₄BDE-66, P₅BDE-85, P₅BDE-99, P₅BDE-100, H₆BDE-138, H₆BDE-153, H₆BDE-154, and H₇BDE-183 were quantified. The resulting profiles are shown in Figure 1. T₄BDE-47 resulted to be the most abundant congener in two pools, while H₆BDE-153 was the prevalent congener in a group of cases, the significance of this difference being difficult to define, also due to the small number of cases grouped in each pool.

Figure 1. PBDE blood levels^a (pg/g fat) in Italian women of reproductive age



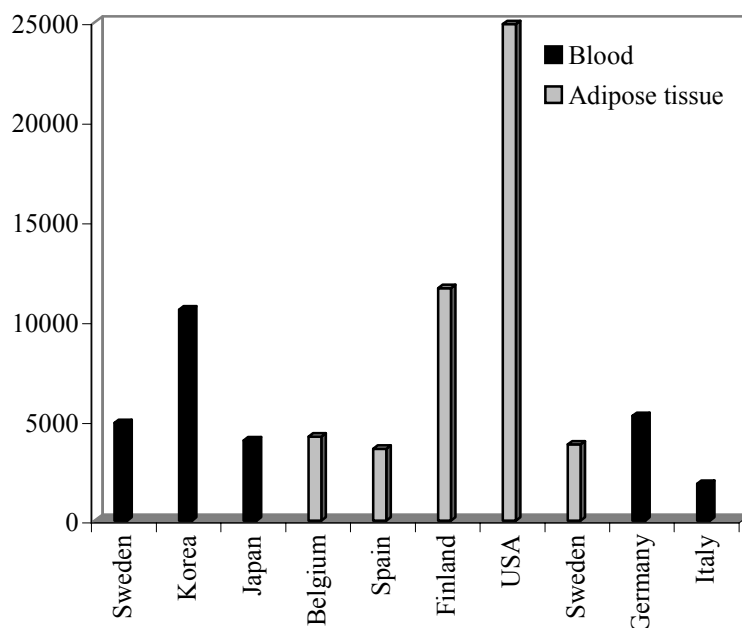
a) Only congeners above the limit of determination are shown.

On the whole, the concentration profile of congeners analyzed is similar to the pattern reported for other European countries, although the ratio between T₄BDE-47 and H₆BDE-153 is lower than what generally observed^{5,9,11,12}. This particularly holds if a comparison is carried out with German data¹². When comparing our data with available literature data on PBDE levels in blood and adipose tissue⁵⁻¹², with respect to the most abundant congeners T₄BDE-47, P₅BDE-99 and H₆BDE-

153, Italian women appear to be included in the distribution range of reported data as shown in Figure 2.

In this preliminary study no significant difference was found between cases and controls, although the small number of samples analyzed does not allow to draw any definitive conclusion.

Figure 2. Mean levels (pg/g fat) of PBDEs [47+99+153] in blood and adipose tissue in different countries



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