

ENDOCRINE DISRUPTORS: ENDOMETRIOSIS AND INFERTILITY

“In utero placental exposure to EDs in animal model”

Damiano Gustavo Mita

Second University of Naples

President of the Interuniversity Consortium -INBB



- Among the Endocrine Disruptors we have chosen the Bisphenol A (BPA).
- BPA is the monomer mainly used to manufacture polycarbonate plastics and in the paint coating food cans.
- 3.000.000 tons of BPA were produced in 2003.
- The demand increases of 6 ÷ 10 % for year.
- Because the ester bonds in BPA-composite polymers are subjected to hydrolysis, leaking of BPA has lead to wide-spread human exposure.



The low-dose effect of BPA is argument of debate

- ❖ A report, funded by the American Plastics Council and prepared by the Harvard Center for Risk Analysis (HRCA), concluded that “*The weight of the evidence for low-dose effects is very weak*”. Only 19 papers, on 47 available, were analysed.

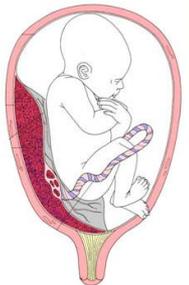
The report was finished in the April 2002 but published in December 2004.

- ❖ On the contrary, at the end of December 2004, 94 publications over 115 reported significant effects in “*in vivo*” experiments. In particular 34 publications on the exposure of vertebrate and invertebrate animals to BPA reported that “*significant effects*” occurred also under the “*safe dose*” of 50 µg/Kg by weight/day.

Source: *Environmental Health Perspectives*, 113, 926-933 (2005)



- We have studied the possible occurrence of endometriosis in mice exposed to two different doses of BPA during the prenatal life and lactation.
- The obtained results will be illustrated by Prof. Baldi in the following.
- In this communication we will report the results relative to the BPA concentrations measured in different tissues of pups of female mice treated with different dose of BPA during the pregnancy and the lactation.



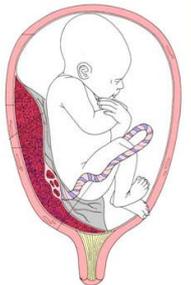
Questions

- Is the placenta a barrier to BPA transport?
- Is there any dependence on the dose of exposure in the BPA concentrations measured in different tissues (liver, muscle, cortex, cerebellum)?
- Is there a gender difference in the BPA concentrations?

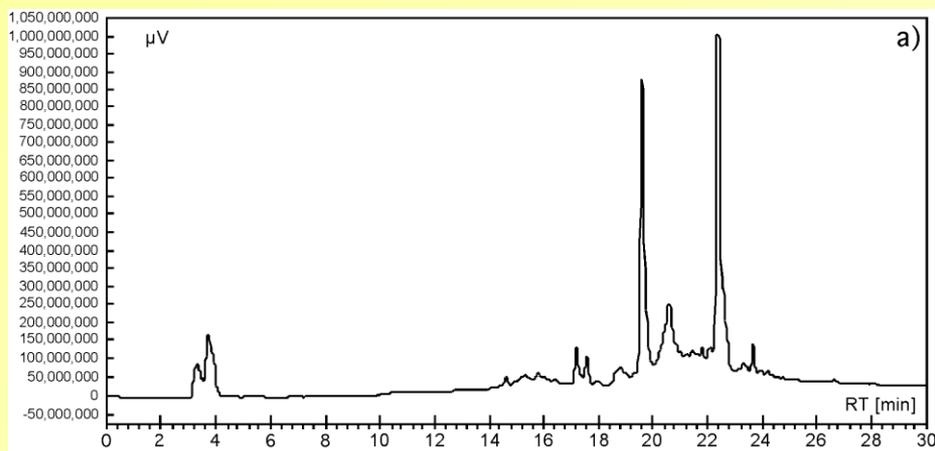


Methodology - HPLC

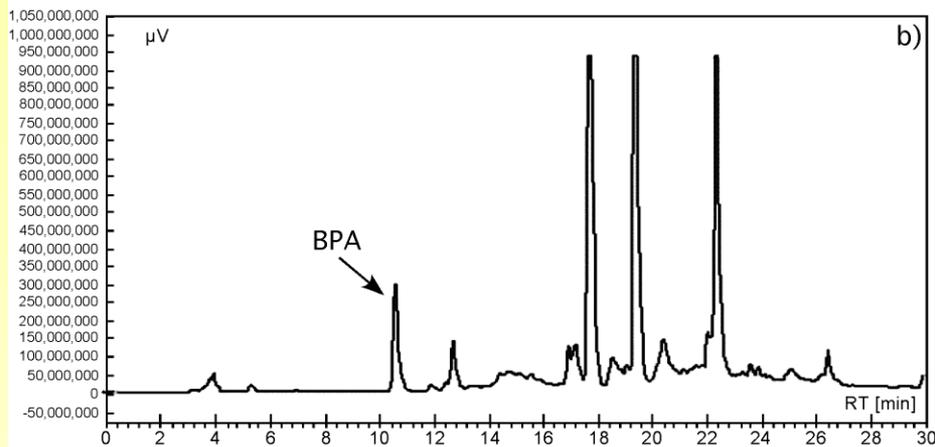
- In order to assess the presence of BPA in target tissues, we used high performance liquid chromatography (HPLC). For the HPLC measurement samples required two preparation steps: extraction and purification.
- The tissues, previously homogenized with methanol, were subjected to solid phase extraction (SPE) using Sep-Pak Light Florisil cartridge (Waters, WAT023543), equilibrated with the same Acetone/Hexane solution. Samples so obtained were dried under a nitrogen stream at 40°C and resolubilized in methanol for HPLC analysis.



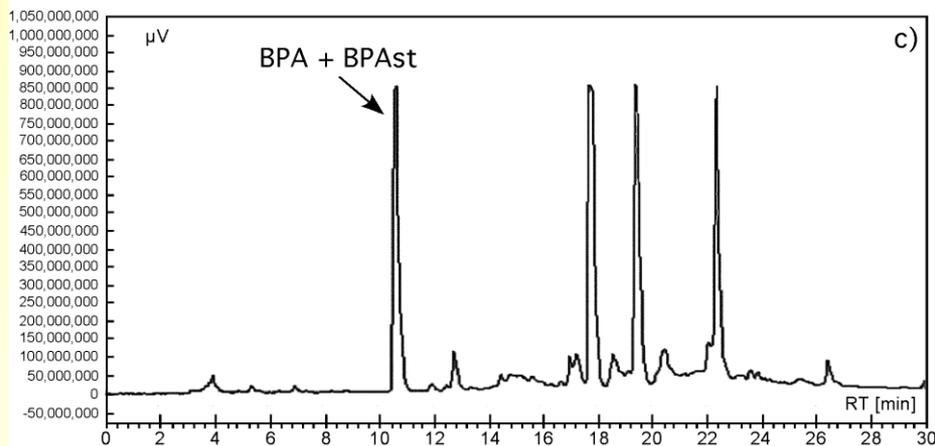
Typical HPLC chromatograms



Absence of BPA



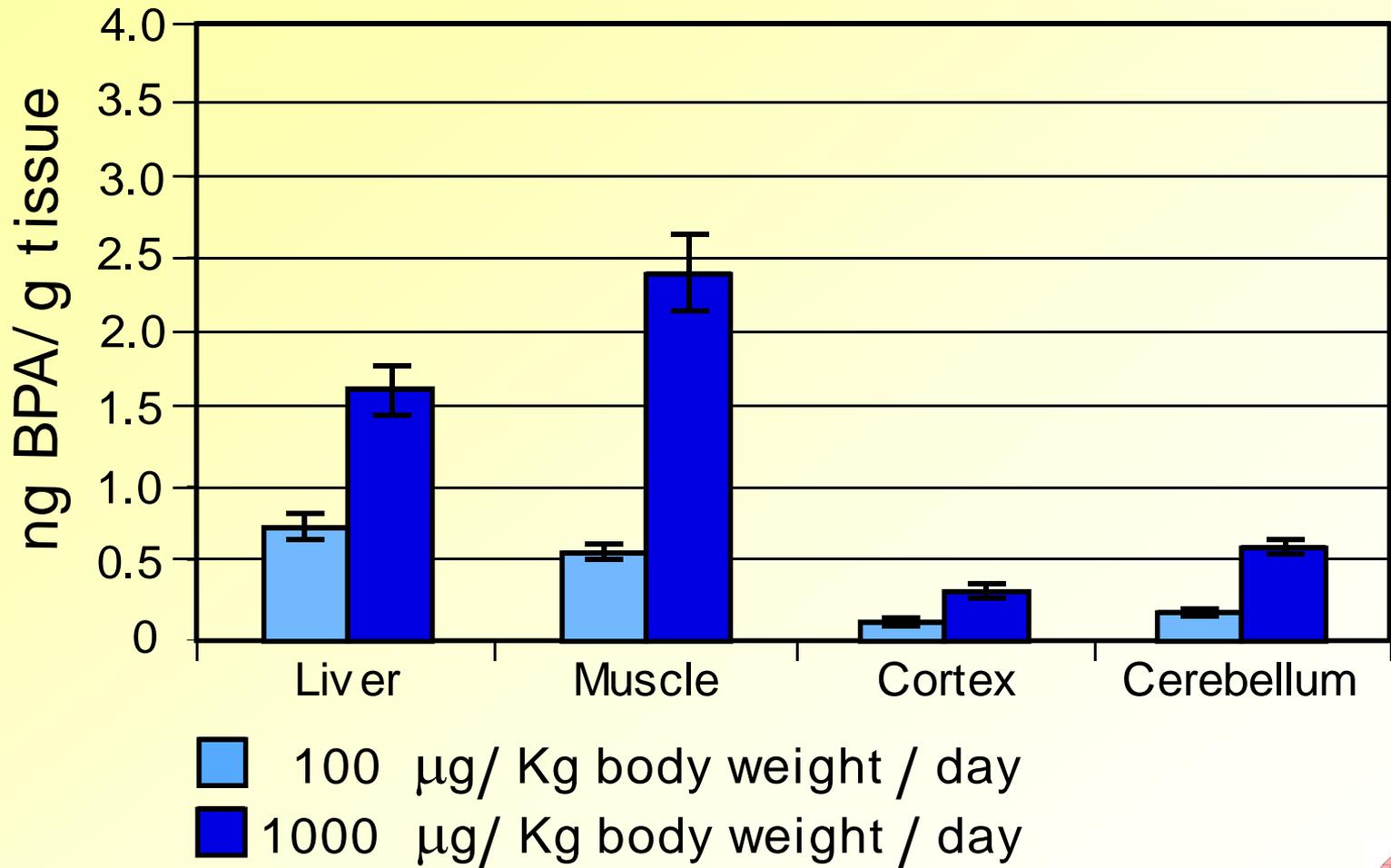
Suspected presence of BPA



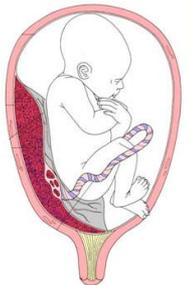
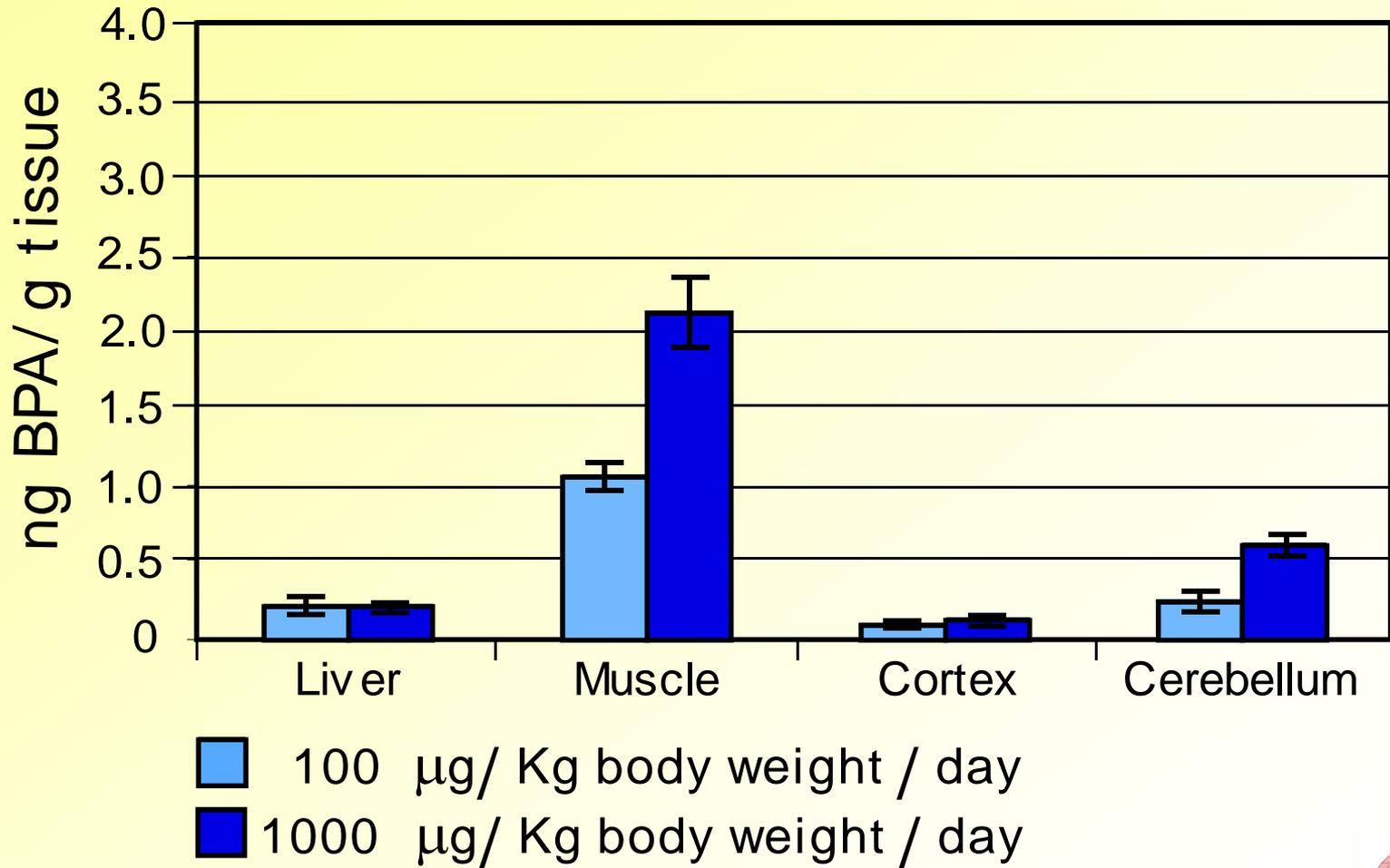
Confirmed presence of BPA



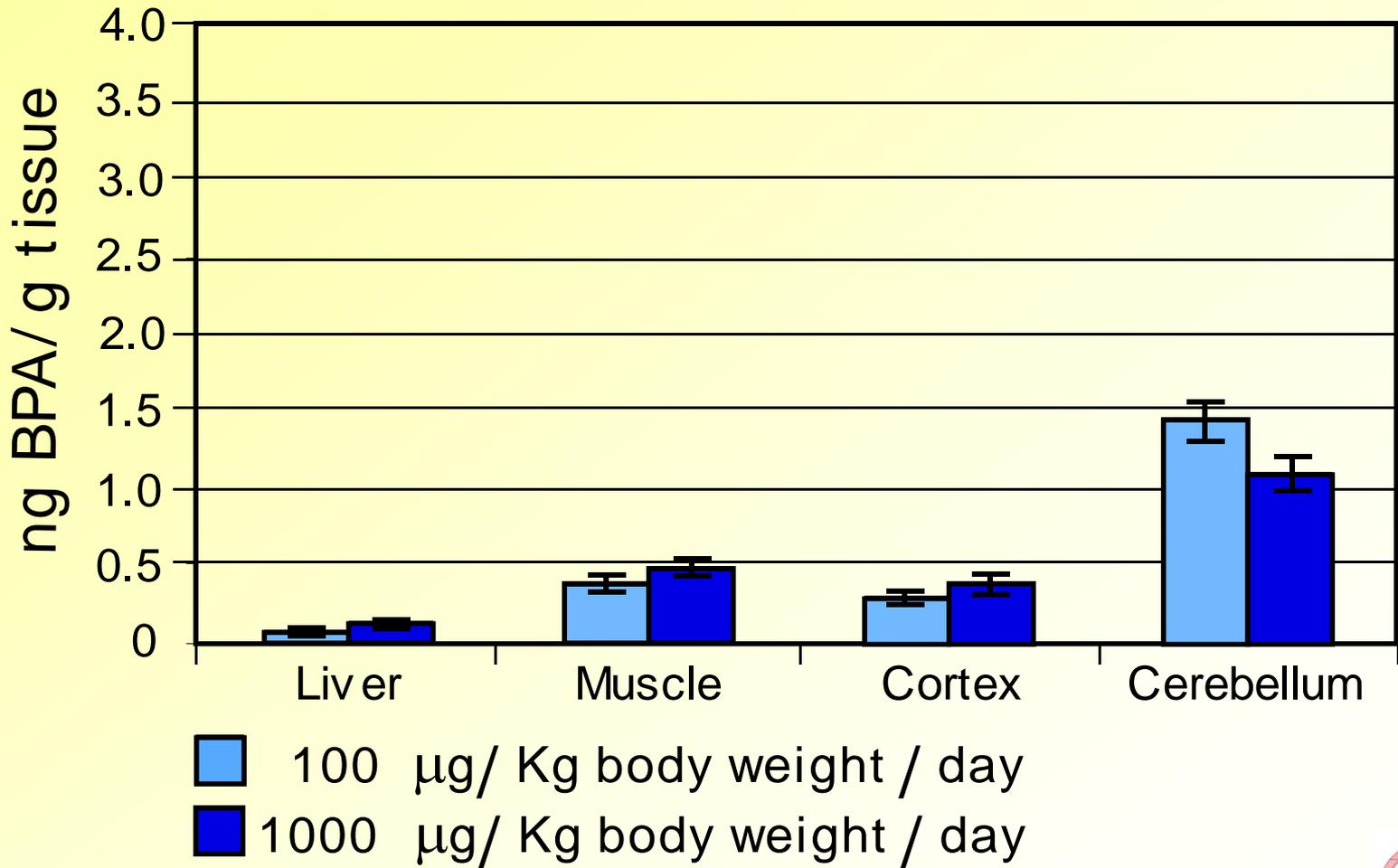
Dams



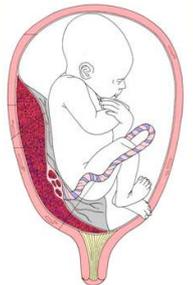
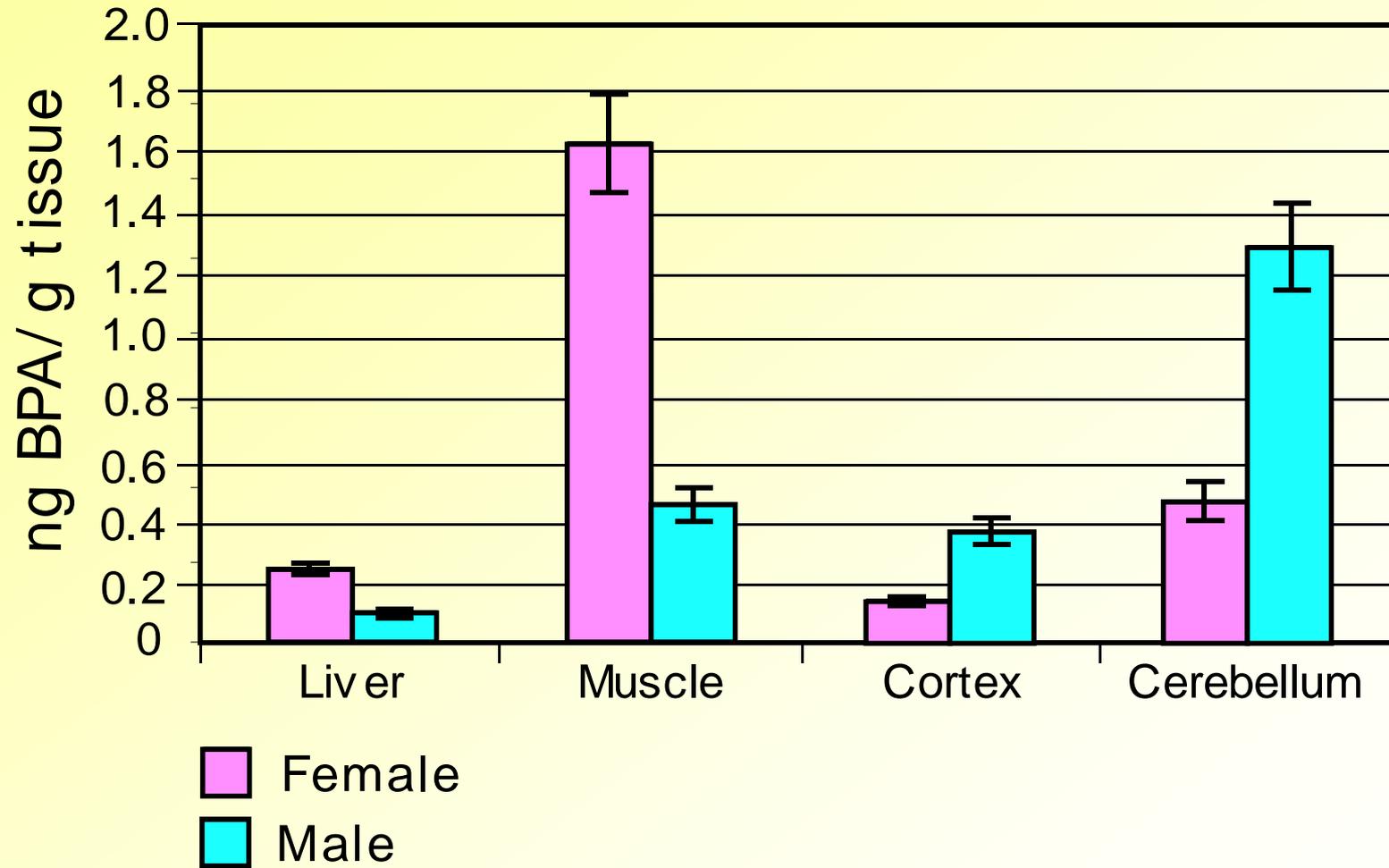
Female pups



Male pups



Average BPA concentration with reference to the gender



Conclusions

- The placenta is not a barrier to BPA transport !
- There is a BPA concentration in the different examined tissues depending on the dose of exposure !
- There is an average BPA concentration gender dependent !

