

## INTRODUCTION

The increasing incidence of obesity is a serious global public health challenge. Endocrine disrupting chemicals (EDCs) are exogenous chemicals that interfere with the endocrine system, including adipose tissue. Increasing evidence from epidemiological, animal, and in vitro studies shows that EDCs, in particular bisphenol A (BPA) and phthalates (e.g. di-ethyl-hexyl-phthalate, DEHP), can affect body weight, adipogenesis and circulating lipid profile, with potential transgenerational effects.

## OBJECTIVE

The aim of this study was to investigate the exposure to BPA and DEHP in a cohort of children with idiopathic obesity (IO).

## METHODS

A case-control study was conducted in 122 children. The study population comprised: 36 girls with IO (mean age  $8.37 \pm 1.64$  years), 30 boys with IO (mean age  $8.6 \pm 1.57$  years), 27 girls controls (mean age  $6.67 \pm 2.3$  years) and 29 boys controls (mean age  $6.46 \pm 2.93$  years). Urine BPA and DEHP metabolites were measured by gas chromatography and high-performance liquid chromatography, coupled with mass spectrometer (LC–MS/MS). Metabolic and hormone levels were assessed. Individual environmental exposure was evaluated through “ad hoc” questionnaires providing data on life styles, diet and other potential determinants of exposure.

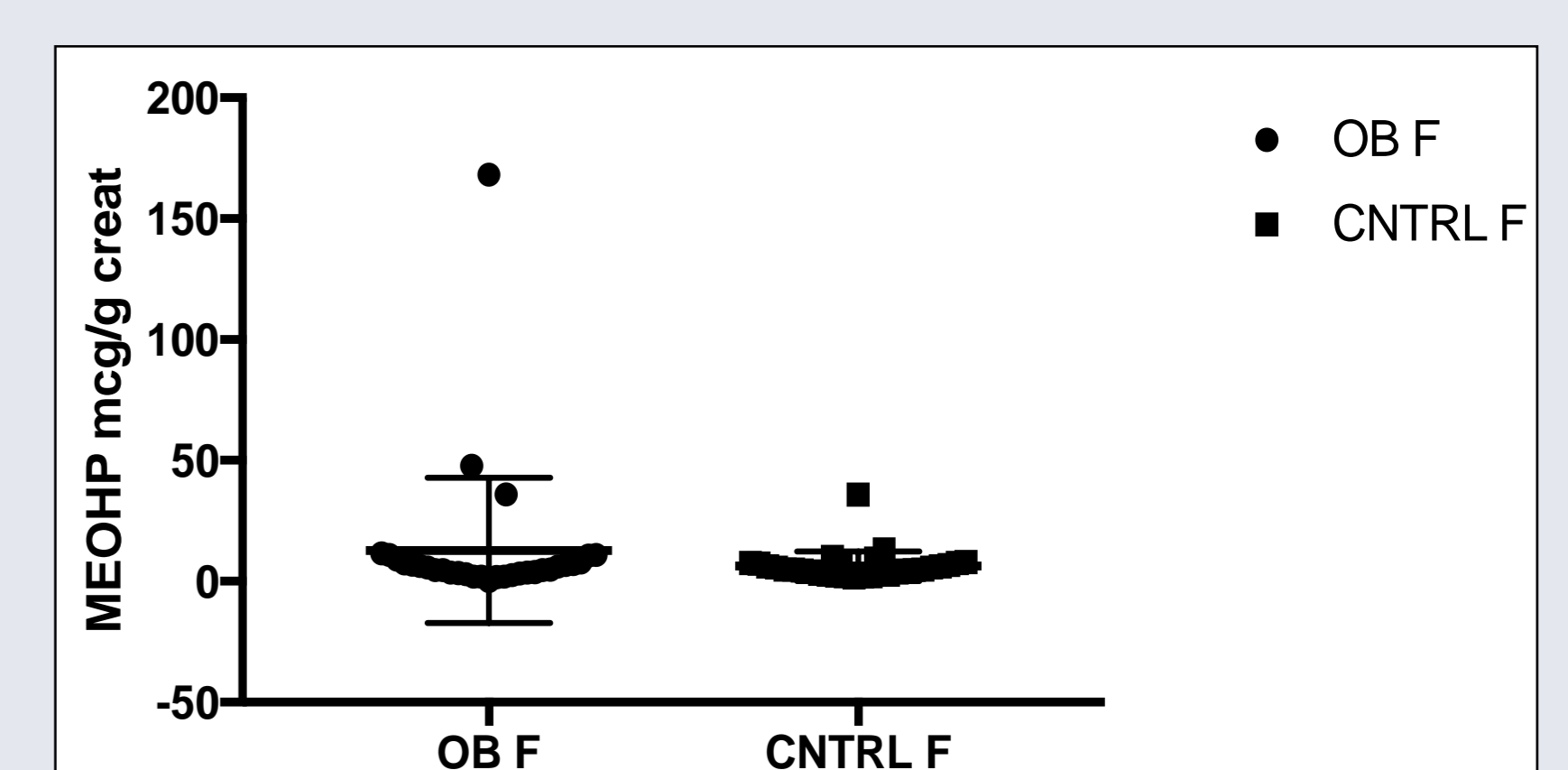
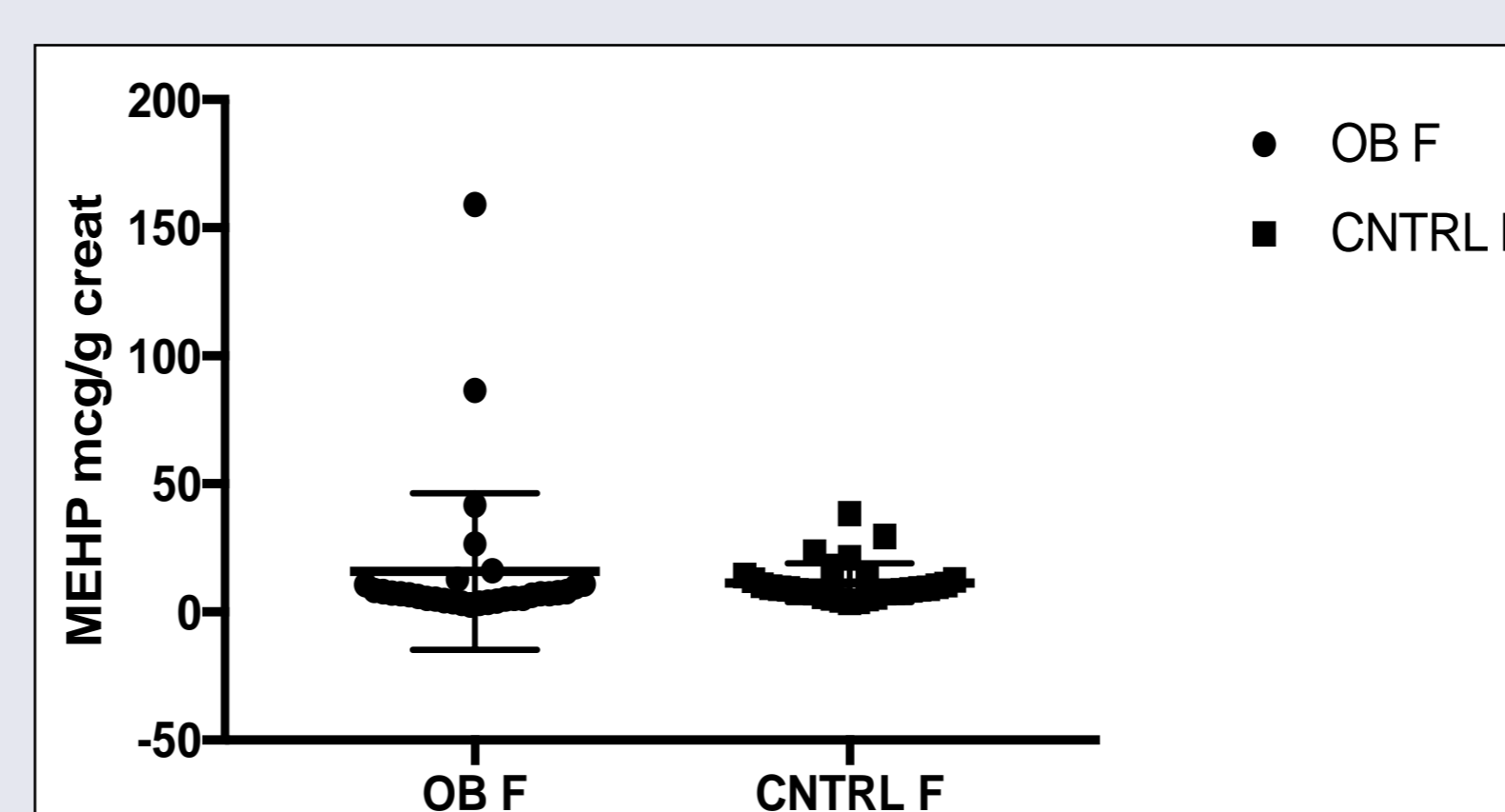
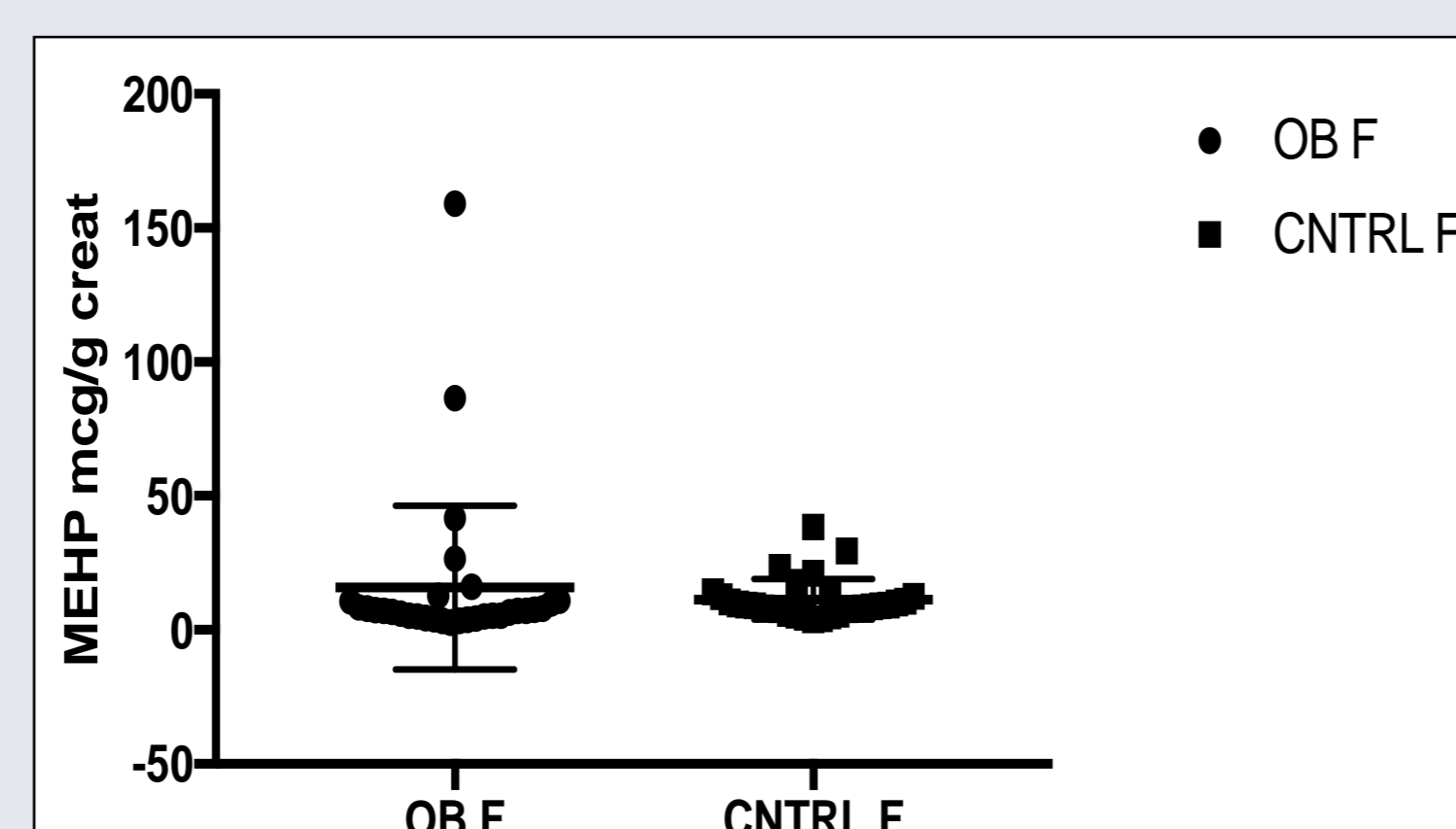
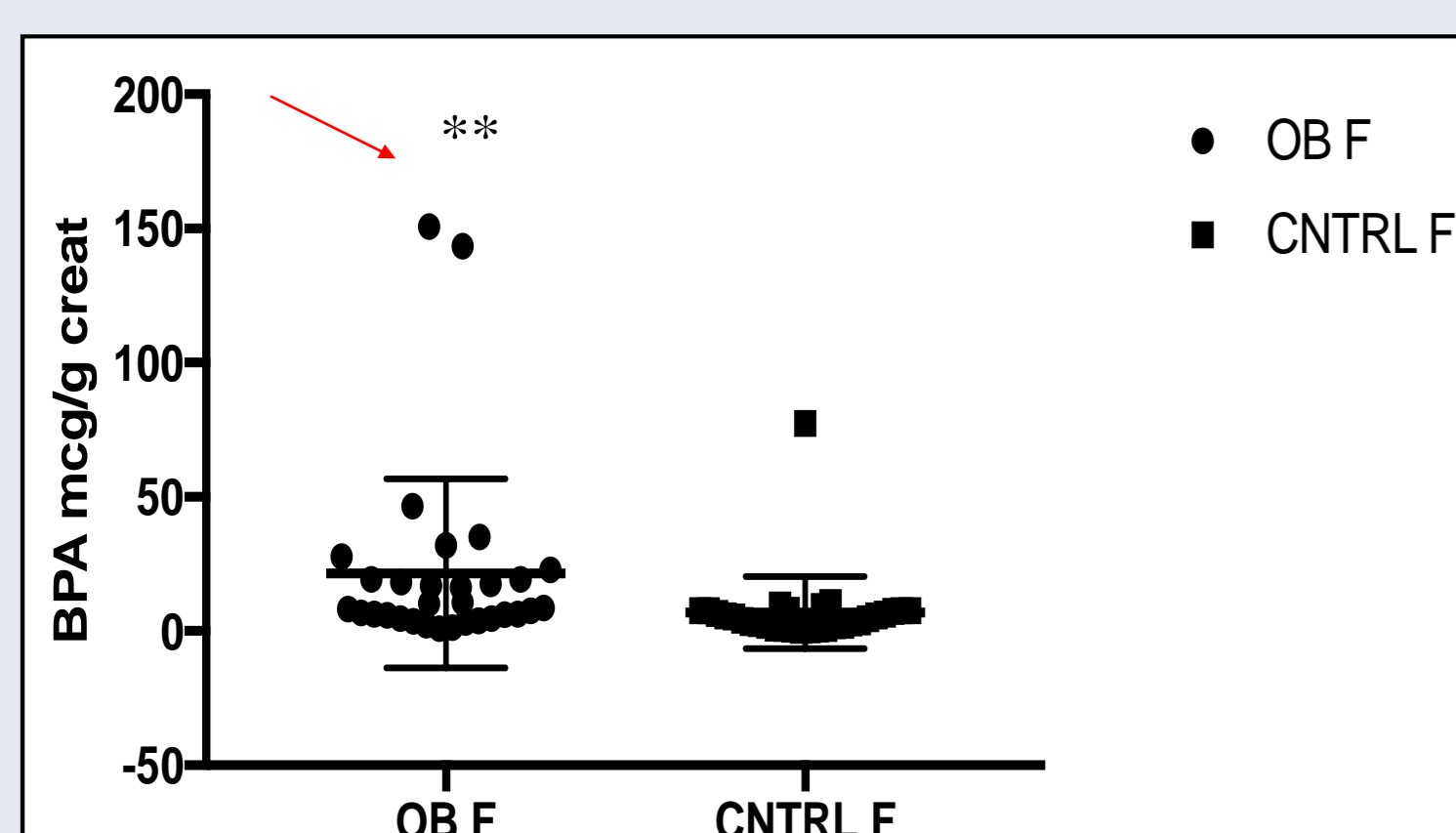
## RESULTS

Both BPA and DEHP metabolites were measurable in all tested samples, including those from control group.

	Ob F n=36	Cntrl F n=27	p value		Ob M n=30	Cntrl M n=29	p value
Glycemia mg/dl	82.50 (78-88)	82(78-85)	NS	Glycemia mg/dl	82.50 (77-88)	84(77-88.5)	NS
insulin mU/L	12.64 (0.5-31.13)	-	<0.001	insulin mU/L	8.5 (1.71-23.51)	-	<0.001
Tot cholesterol mg/dl	143 (132-165)	148 (137-171)	NS	Tot cholesterol mg/dl	149 (140-163)	169 (151-172)	0.02
HDL mg/dl	45 (40-55)	61 (52-70)	<0.001	HDL mg/dl	50 (42-54)	60 (56-74)	<0.05
LDL mg/dl	93 (77-110)	85 (75-101)	NS	LDL mg/dl	93 (76-107)	84 (75-106)	NS
TG mg/dl	80 (61-99)	58 (48-82)	NS	TG mg/dl	65 (50-85)	52(48-68)	NS
Leptin mg/dl	17.93 (10.31-51.98)	4.83 (4.16-9.97)	<0.001	Leptin mg/dl	14.98 (8.19-18.46)	2.45 (1.82-5.07)	<0.001
Adiponectin mg/dl	19.95 (12.54-26.78)	21.77 (15.95-35.02)	NS	Adiponectin mg/dl	15.48 (10.79-22.48)	24.13 (16.22-30.04)	<0.05
BPA mcg/g creat	11.82 (3.8-23.15)	5.36 (3.02-10.85)	<0.05	BPA mcg/g creat	11.26 (6.78-18.16)	10.56 (3.58-19.37)	NS
Σ phthalates mcg/g creat	31.67 (22.14-55.31)	33.3 (18.95-43.86)	NS	Σ phthalates mcg/g creat	24.44 (18.57-35.9)	33.4(20.51-55.83)	NS

Values are medians (10th–90th centile), p <0.05 was considered significant; NS = Not Significant

- Obese girls showed significantly higher BPA urinary levels than controls: median BPA 11.82  $\mu\text{g/g}$  creatinine (range 3.8-23.15) vs 5.36  $\mu\text{g/g}$  creatinine (range 3.02-10.85), respectively (p<0.001).
- No significant difference in DEHP metabolites level was found.
- In obese girls, a positive correlation between BPA levels and adiponectin was found (r= 0.4, p<0.05).
- Furthermore, phthalate levels positively correlated with leptin (r= 0.35, p<0.05).
- In obese boys no significant difference in EDC levels was revealed. Also, no significant correlation between EDC levels and other metabolic/endocrine parameters was observed.
- A higher risk of being obese has been found in children with BPA levels above the median values with the habit to eat food packaged in plastic (OR=11.09, 95% CI=1.28-95.78).



## CONCLUSIONS

Our findings show the widespread exposure to BPA and DEHP and indicate that the exposure to BPA is significantly higher in obese girls. The frequent consumption of food packaged in plastic may be the main modality of BPA contamination. Further experimental and clinical investigations are necessary to unveil the potential cause-effect relationship.