

# Placental expression of fatty acid transporter related to maternal pre-pregnancy weight

María Teresa Segura

EURISTIKOS Excellence Centre for Paediatric Research. University of Granada

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**Note: for non-commercial purposes only**

# Maternal pathologies: GDM and/or Obesity



Aberrant Placental morphology and transport capacities



Altered placental development



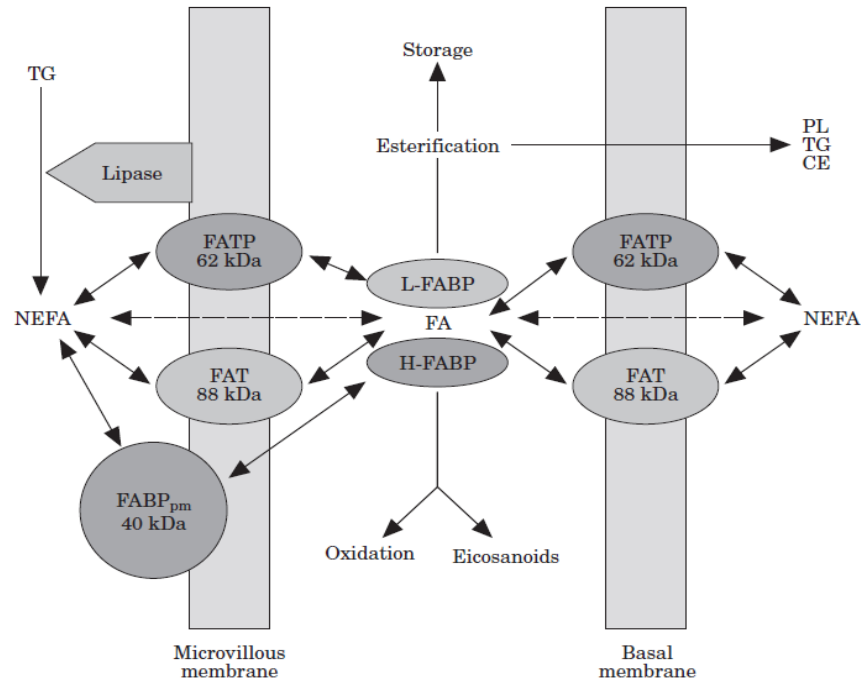
Pregnancy complications



Long-term consequences for the offspring: obesity, hypertension, type 2 diabetes mellitus and metabolic syndrome

- Fatty Acids (FA) are crucial for fetal growth and development
- Placental FA uptake, metabolism and transfer depend on maternal nutrient supply

Placenta (2002), Vol. 23, Supplement A, Trophoblast Research, Vol. 16



Aim: To evaluate if expression of genes involved in FA uptake and metabolism in placenta are affecting by high maternal pre-pregnancy Body Mass Index (BMI)

# STUDY DESIGN

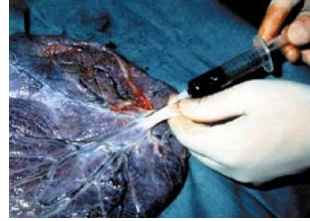
## 474 ASSESSED FOR ELIGIBILITY



### 331 INCLUDED



Gestation

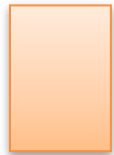


Birth



Postnatal age

Pre



24<sup>th</sup> and 34<sup>th</sup>

weeks

37 - 40<sup>th</sup>

3, 6, 12, 18

months

Maternal  
Weight

Maternal  
Blood samples  
Anthropometry

Maternal & cord  
blood samples  
Placenta  
Neonatal  
anthropometry

Mother & babies  
anthropometry  
Maternal blood  
samples at 6 months

12-20<sup>th</sup> weeks  
Recruitment

# Methods

- Subjects classification: BMI according to World Health Organization (WHO):
  - Normal weight :  $18.5 \leq \text{BMI} < 25 \text{ kg/m}^2$
  - Obese :  $\text{BMI} \geq 30 \text{ kg/m}^2$
- Samples collection: Placental tissue was collected after delivery. Samples were washed up in saline solution, added to 2.5 mL of RNA later solution and kept at  $-80^{\circ}\text{C}$  until analysis.

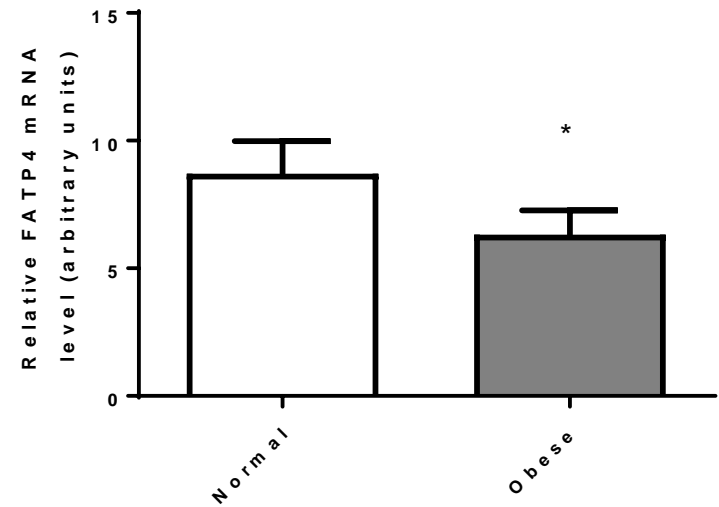
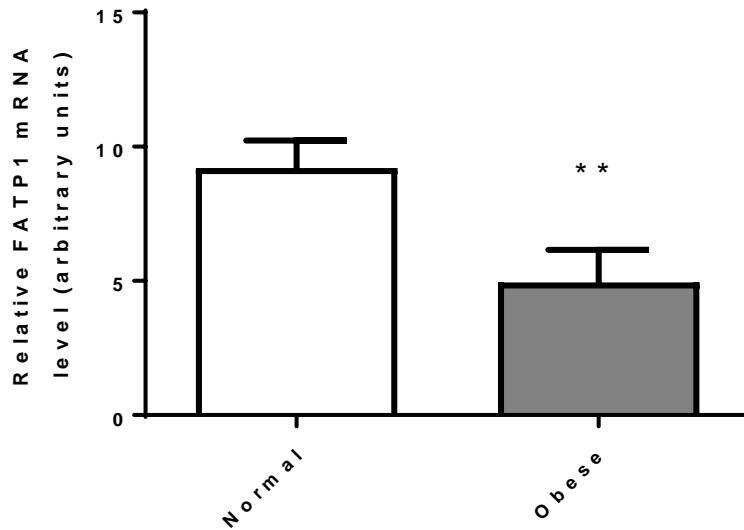
# Methods

- Samples analysis:
  - RNA isolation: Extraction of microRNA using miRNAeasy kit (Quiagen, Hilden, Germany)
  - Measure RNA concentration by NanoDrop and quality control in Agarosa Gel (one aliquot for every sample was heated up at 37°)
  - Synthesis of complementary DNA with QuantiTect Reverse Transcription Kit (Qiagen, Hilden, Germany) using 1.5 µg RNA and oligo (dT) 18 primers
  - PCR-RT using a Light Cycler 480 II system (Roche Applied Science, Germany).
  - Selection of adequate House Keeping – genes for normalization of RT-PCR results (19 genes were tested)
  - Data normalization to the geometric mean of the expression of B2M and YHWAZ genes using the software GenEx Pro

## Maternal, placental and neonate characteristics

	Normal weight	Obese
	(n = 37)	(n = 30)
Maternal Age (years)	31 (5)	31 (6)
Smokers (No) (%)	86.30	90.90
BMI (Kg/m <sup>2</sup> )	21.79 (2.78)	32.86 (3.73)*
Weight gain 34 weeks (Kg)	13 (4.50)	6.75 (8.35)*
Gestational Age (weeks)	39 (2)	40 (2)
Mode of Delivery (vaginal) (%)	86.50	70.40
Placenta weight (g)	500 (140)	550 (222)*
Birth weight (g)	3260 (445)	3540 (637)*
Newborn/placenta weight ratio	6.92 (2.06)	6.33 (1.66)
Gender (Male) (%)	51.80	63.90

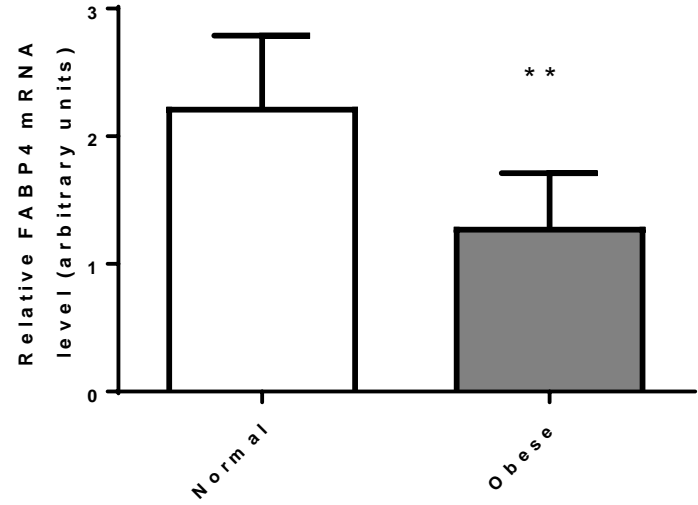
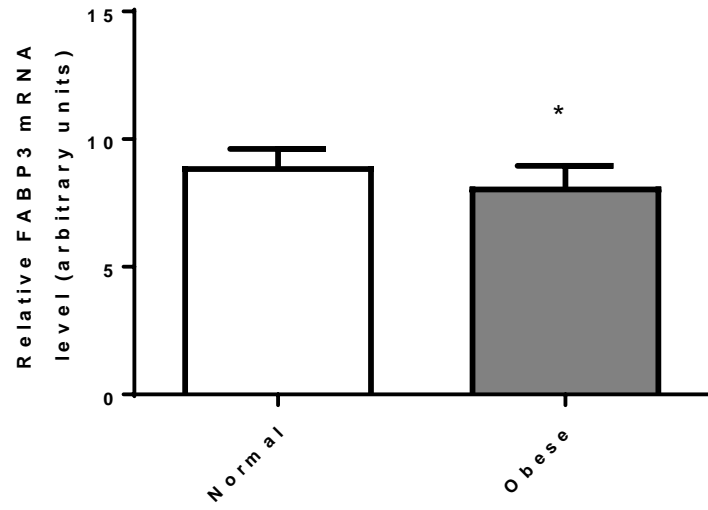
# Results



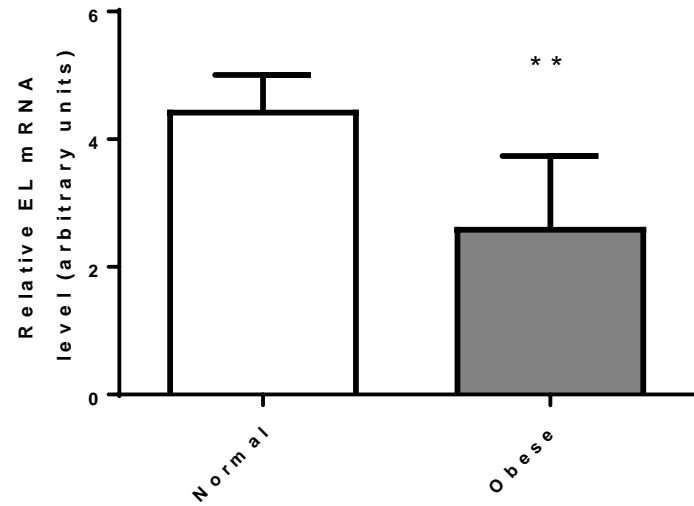
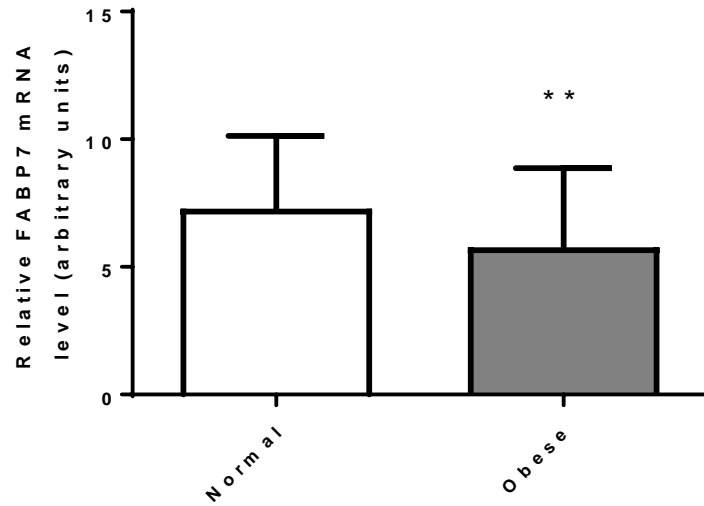
\* P' value < 0.05, \*\* p-value < 0.001 Group comparison by Kruskal-Wallis



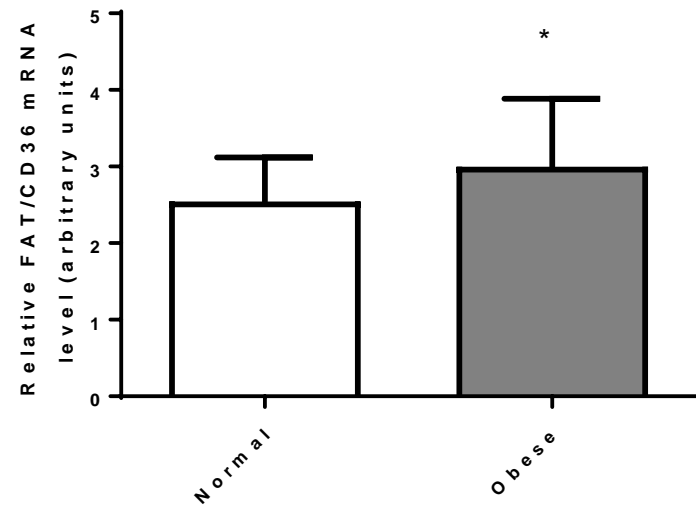
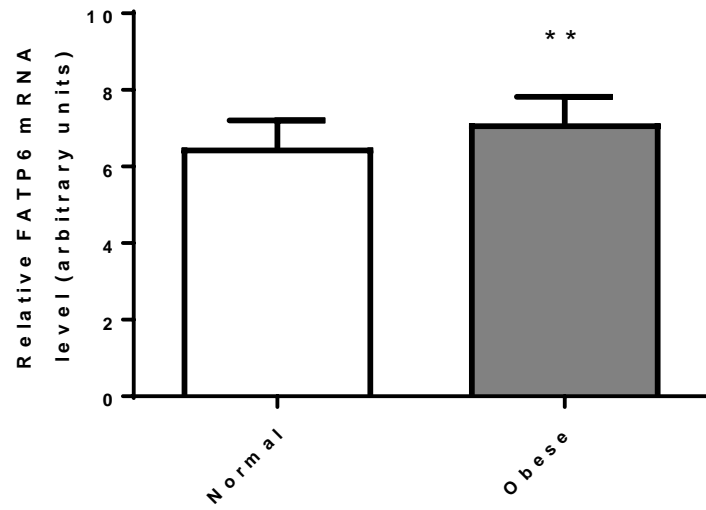
# Results



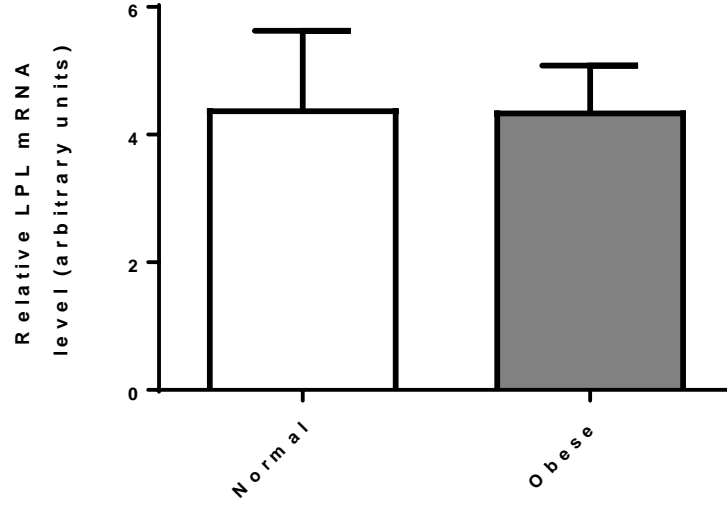
# Results



# Results



# Results



# Conclusions

- Obesity alter placental mRNA expression of genes involve in FA uptake and metabolism suggesting a placental adaptations to a maternal unfavorable intrauterine environment.
- Fetal development and long- term health in offspring of obese women could be affected by altered transfer of FA
- How these altered mRNA expression affect to fetal development during first and mid pregnancy is limited so far.

# Acknowledge

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Thank you for your attention!