

# Sex differences in the pubertal response to high-fat diet

Freire-Regatillo A<sup>1,2</sup>, Argente-Arizón P<sup>1,2</sup>, Díaz F<sup>1,3</sup>, Barrios-Sabador V<sup>1</sup>, Arévalo A<sup>4</sup>, Argente J<sup>1,2,3</sup>, García-Segura LM<sup>4</sup>, Azcoitia I<sup>5</sup>, Chowen JA<sup>1,2,3</sup>

<sup>1</sup>Department of Endocrinology, Hospital Infantil Universitario Niño Jesús, Madrid, Spain. <sup>2</sup>Department of Paediatrics, Universidad Autónoma de Madrid, Madrid, Spain. <sup>3</sup>Centro de Investigación Biomédica en Red de Fisiopatología de la Obesidad y Nutrición (CIBEROBN), Madrid, Spain. <sup>4</sup>Instituto Cajal, Centro Superior de Investigaciones Científicas (CSIC), Madrid, Spain. <sup>5</sup>Department of Cellular Biology, Universidad Complutense de Madrid, Madrid, Spain.



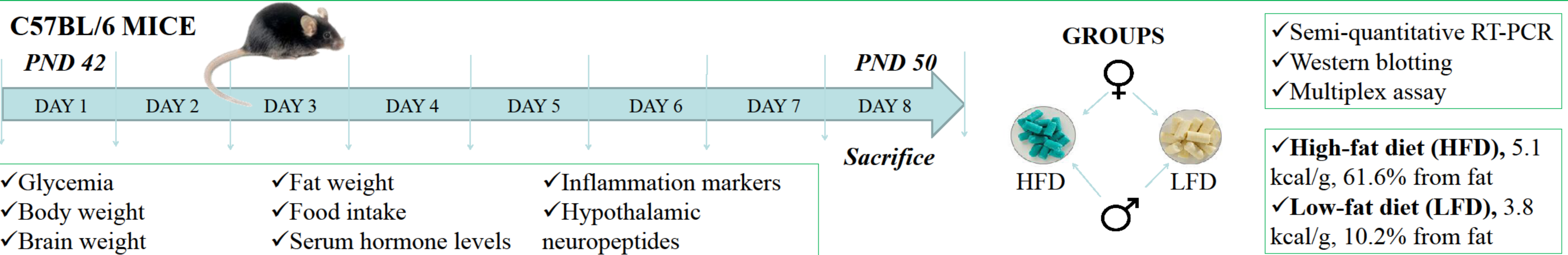
## BACKGROUND

It is well known that ingestion of a high fat diet (HFD) can induce rapid weight gain and metabolic imbalances. However, males and females are not equally susceptible to these effects. Furthermore, an individual may be more prone to gain weight during specific developmental periods.

## OBJECTIVE

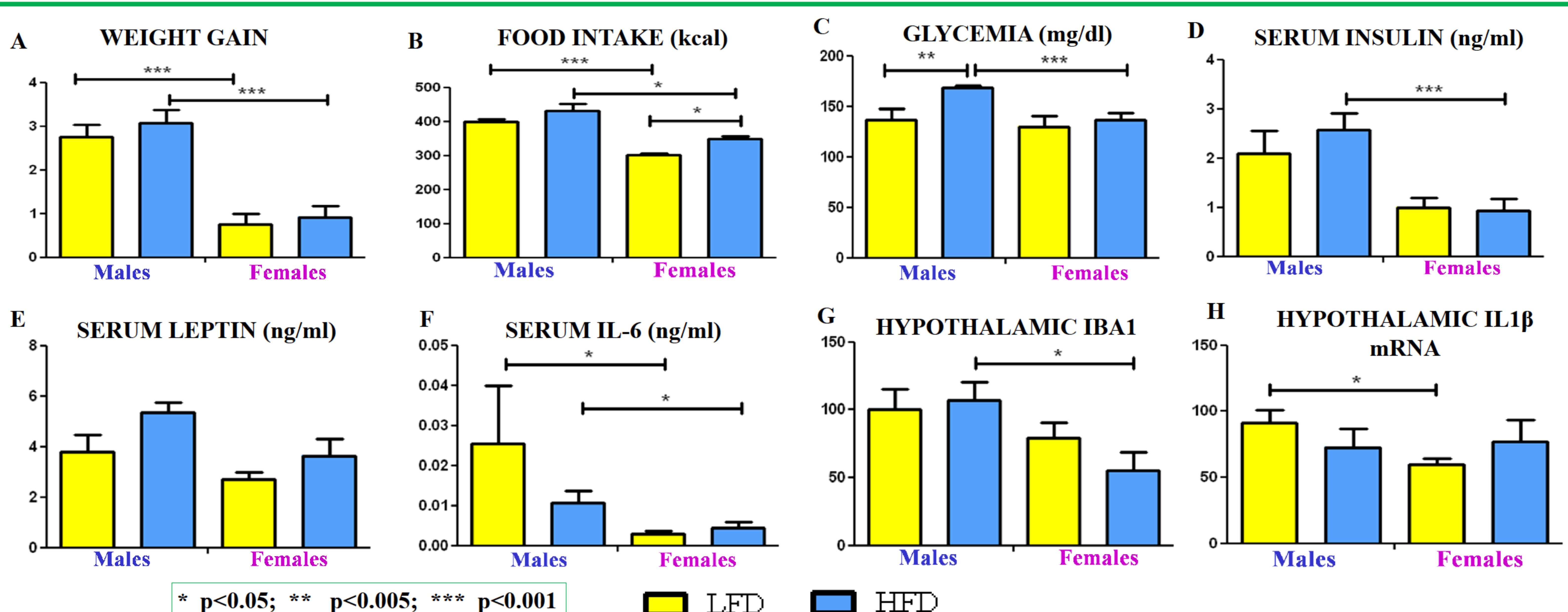
We aimed to analyze the response to the acute exposure to a high fat diet during the pubertal/adolescent period and to determine whether males and females respond differently.

## METHODS



## RESULTS

Weight gain and food intake were higher in males (A and B), with HFD increasing the latter in females (B). HFD-fed male mice showed increased glycemia (C) and insulin levels (D). Males on a HFD had higher glycemia than those on a LFD (C), but no change in insulin levels (D). HFD tended to augment serum leptin levels, especially in males, increasing the sex difference (E). IL6 levels were significantly higher in males, regardless of diet (F). Levels of the microglial marker Iba1 in the hypothalamus were different between sexes when on a HFD (G). Hypothalamic expression levels of IL1 $\beta$  were higher in males, when compared to females on a LFD, but this dimorphism disappeared in HFD-fed mice (H). Expression levels of IL6 and TNF $\alpha$  showed no changes (data not shown).



## CONCLUSIONS

1. HFD rapidly increases food intake, especially in female mice.
2. Adolescent male mice respond rapidly to HFD intake, by increasing leptin and glucose levels after only eight days of exposure.
3. Sex differences in certain obesity and inflammation-related factors are exacerbated by a HFD in pubertal mice.

