CONCLUSION: FFAs have a direct effect on astrocytes, inducing cytokine production and oxidative stress, suggesting that these glial cells participate in the response to a HFD. Moreover, astrocytes from males are more sensitive to FFAs, indicating that this might be involved in their increased sensitivity to HFD.

INTERLUDE

It is well accepted that obesity is associated with chronic systemic inflammation. Recently hypothalamic inflammation has been described in response to high fat diet (HFD)-induced obesity and proposed to participate in central insulin/leptin resistance and the perpetuation of weight gain and systemic affection. The weight gain and central responses to HFD differ between males and females. As hypothalamic glial cells are implicated in the central inflammatory response it is possible that their response to free fatty acids (FFAs) differs between the sexes.

HYPOTHESIS

We hypothesized that astrocytes have an active response to free fatty acids (FFAs) and that this response is sexually dimorphic.

RESULTS

After 24 hours of OA plus PA (1:1) treatment: As expected, CPT1a increased according to the dose of FFAs. The amount of nitrates and nitrites released also increased in a dose responsive manner in both sexes (p<0.0001). Basal levels of IL1β, IL6 and TNFα were higher in male cultures compared to females (p<0.0001). In response to FFAs, IL6 increased in males and females (p<0.0001). However, IL1β only increased in male astrocytes (p<0.0001). GFAP mRNA levels were decreased in males at a concentration of 0.5mM, while in females a higher concentration was needed.

CONCLUSION: FFAs have a direct effect on astrocytes, inducing cytokine production and oxidative stress, suggesting that these glial cells participate in the response to a HFD. Moreover, astrocytes from males are more sensitive to FFAs, indicating that this might be involved in their increased sensitivity to HFD.