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## Trabalhos Científicos

**Título:** Structural And Functional Abnormalities In The Hypothalamus Of Obese Children

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**Resumo:** Objective: In experimental diet-induced obesity, the hypothalamus is affected by an inflammatory response that disturbs the function of key neurons involved in the regulation of caloric intake and energy expenditure. In obese adult humans, neuroimaging studies have shown a defective hypothalamic response to nutrients as well as structural changes characterized by gliosis. However, no previous studies have evaluated structurally and functionally, the hypothalamus of obese children and adolescents. Methods: Cross-sectional study performed in a tertiary university hospital. Twelve obese and 11 lean agreed to participate. Quantitative MRI (magnetic resonance imaging) with the measurement of T2 relaxation time was used to investigate hypothalamic tissue characteristics and functional MRI was used to evaluate hypothalamic response after oral glucose ingestion. Results: Obese subjects had longer T2 relaxation times in the Medial Basal Hypothalamus (MBH) when compared to lean group ( $105.9 \pm 4.2$  vs  $99.5 \pm 4.3$  ms,  $P < .004$ ), consistent with gliosis. Moreover, there was a highly significant group\*region interaction ( $P = .002$ ), demonstrating that signs of gliosis were specific to the MBH as compared to control brain regions. Longer T2 relaxation times were correlated with higher visceral body fat percentage ( $R^2 = 0.35$ ,  $P = .04$ ) and android fat percentage ( $R^2 = 0.46$ ,  $P = .009$ ), but not fasting insulin concentrations ( $R^2 = 0.02$ ,  $P = 0.6$ ). In functional studies, the hypothalamus of obese children presented an impaired response to oral glucose ingestion, with lower mean signal change ( $0.017 \pm 0.019$  vs  $0.044 \pm 0.018$ ,  $P < .001$ ) and a lower general connectivity with brain gray matter ( $0.374 \pm 0.016$  vs  $0.386 \pm 0.015$ ,  $P = .01$ ). Conclusion: This is the first study demonstrating that the hypothalamus can be functionally and structurally affected in childhood obesity.