

Publication

The impact of gut hormones on the neural circuit of appetite and satiety: A systematic review

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The brain-gut-axis is an interdependent system affecting neural functions and controlling our eating behaviour. In recent decades, neuroimaging techniques have facilitated its investigation. We systematically looked into functional and neurochemical brain imaging studies investigating how key molecules such as ghrelin, glucagon-like peptide-1 (GLP-1), peptide tyrosine-tyrosine (PYY), cholecystokinin (CCK), leptin, glucose and insulin influence the function of brain regions regulating appetite and satiety. Of the 349 studies published before July 2016 identified in the database search, 40 were included (27 on healthy and 13 on obese subjects). Our systematic review suggests that the plasma level of ghrelin, the gut hormone promoting appetite, is positively correlated with activation in the pre-frontal cortex (PFC), amygdala and insula and negatively correlated with activation in subcortical areas such as the hypothalamus. In contrast, the plasma levels of glucose, insulin, leptin, PYY, GLP-1 affect the same brain regions conversely. Our study integrates previous investigations of the gut-brain matrix during food-intake and homeostatic regulation and may be of use for future meta-analyses of brain-gut interactions.

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