

Ghrelin from the gut and the brain regulates neural circuits in the brain

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Food intake and body weight are controlled by complex, interacting, central and peripheral mechanisms. Genetic and pharmacological studies demonstrate that the hypothalamic melanocortin system is part of the final common pathway for metabolic and nutritional signal processing. To better understand how peripheral signals are processed and integrated by the brain we have utilized mice that express fluorescent proteins in the key cell groups of the melanocortin system within the arcuate nucleus.. Using these models we have “mapped” melanocortin circuits in the brain and shown that the circuitry is directly or indirectly sensitive to many nutritional/energy signals (leptin, ghrelin, peptide YY₃₋₃₆, glucose, pancreatic polypeptide, and serotonin). Ghrelin is the only signal that increases melanocortin tone; additionally we have described neurons in the hypothalamus that produce ghrelin. These studies highlight a novel and important role for ghrelin in the control of energy balance.