

Control of energy balance by nutrient sensing neurons

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Obesity confers significant health risks, and rates of obesity continue to rise within the developed and developing world. The Cowley lab has discovered how Proopiomelanocortin (POMC) neurons in the brain detect levels of leptin, which signals adipose stores. This signal allows the brain to regulate food intake and energy expenditure to maintain homeostasis. We have also discovered that the melanocortin circuits transduce the appetite reducing actions of the gut hormone PYY3-36, and the appetite stimulating actions of ghrelin. This suggests that the melanocortin circuits are a major neural center for processing signals of energy status to regulate long term body weight. More recently the lab has discovered how the brain becomes resistant to leptin, and how leptin resistance is a hallmark of obesity. The lab has developed several therapies that bypass leptin resistance and regulate food intake and energy expenditure to reduce adipose stores and cause weight loss. One of these therapies has recently completed Phase 3 trials.