

Appetite– What do Hormones Have to Do With It?

So hungry you could eat a horse? Why? Are you just weak-willed, lack-of self-control? No, blame it on [hormones](#). The hypothalamus acts as the control center for hunger and satiety for **men, women and children**. This part of the brain allows entry through the blood-brain barrier of peripheral peptides and proteins that directly interact with brain neurons. These neurons then express peptides (the appetite control hormones described below) that stimulate food intake and weight gain.

Circulating hormones play important roles in appetitive behaviors. Of these, ghrelin, or growth hormone, is the only known circulating appetite stimulant. Ghrelin levels rise prior to meals, then fall quickly after ingestion of nutrients. Scientists think a primary role of ghrelin is to act as a meal initiator. Ghrelin may also alter energy balance by stimulating adipogenesis, or formation of more and larger fat cells. Ghrelin levels in are low in obese people, and markedly high in subjects with total lack of appetite.

The hypothalamus is also the master regulator of satiety. Unlike appetite stimulation, there are many peripheral peptides associated with satiety. The list of “feeling full” hormones begins with **cholecystokinin (CCK)**. In addition to inhibiting food intake, CCK stimulates pancreatic secretion, gall bladder contraction, intestinal motility, and inhibition of gastric mobility. All of these biologic actions keep us feeling fuller longer.



Insulin is another of these satiety regulators of appetite. Insulin levels increase rapidly after a meal and vary directly with changes in adiposity. Once insulin enters the brain, it acts as a loss of appetite signal. Thus we are less likely to help ourselves to seconds if insulin levels in the brain are high.

Leptin is a potent hormone appetite regulator. Leptin is formed in all adipose tissue, but to a greater degree in the subcutaneous adipose tissue (the kind that causes fat rolls and bulging bellies). The more fat we have the higher our leptin levels. Leptin secretion does not appear to be driven by meal patterns. Rather, a circadian pattern exists, characterized by high levels between midnight and early morning hours and a decrease around noon to mid-afternoon. Increased leptin levels can result in increased food intake, increased fat stores, and infertility. It is the “bad guy hormone” for weight loss.

Finally, the hormone adiponectin is secreted by the mature fat cell. Increased adiponectin levels appear to decrease body fat mass by stimulation of fatty acid oxidation in muscle. Adiponectin also decreases food intake and obesity. Increasing adiponectin by weight loss and treatment leads to improved insulin sensitivity and improved diabetic outcomes.

Medical interventions to regulate levels of appetite hormones may be the wave of weight loss management for the future. Meanwhile, the next time you reach for an unhealthy snack, think am I really hungry, or is it [just hormones](#)?