Abstract

Due to the fact that the obesity epidemic shows no signs of diminishing, a better understanding of the physiological mechanisms underlying energy homeostasis has become necessary. During this process energy intake is matched to energy expenditure over time, in such a way that body fuel stored in the form of adipose tissue is held constant despite daily fluctuations in caloric intake. The system that controls energy balance possesses 2 components: a short and a long-term. The short-term system is in charge of appetite regulation or the initiation and termination of individual meals. It responds basically to gut hormones or satiety signals that accumulate during eating and ultimately contribute to meal termination. Adiposity factors are circulating signals generated in proportion to the body energy storages, such as insulin and leptin, levels of which are involved in the regulation of energy balance over long intervals thereby promoting body weight stability. The central melanocortin pathway represents a crucial integration point for these signals. Melanocortin receptor ligands are synthesized by discrete neuronal populations within the arcuate nucleus of the hypothalamus and exert actions in both components of the energy balance equation. In addition to hormones, the brain also responds directly to the nutrient circulating levels. Two fuel-sensing protein kinases functioning as main regulators of body weight and food intake in the hypothalamus have been identified: mTOR and AMPK. Besides these basic homeostatic circuits, the hedonic mechanisms of feeding are important in the regulation of energy intake since they can override the energy balance system regulatory capability. The aim of this article is to review recent advances in the comprehension of the mechanisms underlying body weight and appetite regulation. Those mechanisms not only allow a new understanding about obesity pathophysiology but also provide new perspectives for its treatment.

Keywords

Body weight, obesity, appetite, leptin, anorexia, appetite depressants.