

possible intrauterine factors (e.g., maternal gestational weight gain and stress) are contributors to the current increases in childhood obesity ([Li, Magadia, Fein, et al, 2012](#)). More research is needed to better understand the influences of family behavior and adolescent overweight.

Fewer than 5% of the cases of childhood obesity can be attributed to an underlying disease. Such diseases include hypothyroidism; adrenal hypercorticism; hyperinsulinism; and dysfunction or damage to the central nervous system (CNS) as a result of tumor, injury, infection, or vascular accident. Obesity is a frequent complication of muscular dystrophy, paraplegia, Down syndrome, spina bifida, and other chronic illnesses that limit mobility.

A major focus of obesity research has been on **appetite regulation**. The expression of appetite is chemically coded in the hypothalamus by distinctive circuitry involved in drive and motivation. Orexigenic substances produce signals that increase appetite, and anorexigenic substances promote the cessation of eating behaviors. Feedback loops between signals have been identified where one signal peptide is able to alter the secretion of another signal peptide. No one signal has been identified as the gatekeeper of appetite. It is apparent that an entire network of signals, including their frequency and amplitude, is responsible for triggering eating behaviors.

There is little evidence to support a relationship between obesity and **low metabolism**. Small differences may exist in regulation of dietary intake or metabolic rate between obese and nonobese children that could lead to an energy imbalance and inappropriate weight gain, but these small differences are difficult to accurately quantify. Obese children tend to be less active than lean children, but it is uncertain whether inactivity creates the obesity or obesity is responsible for the inactivity. The tendency toward obesity is manifested whenever environmental conditions are favorable toward excessive caloric intake, such as an abundance of food, limited access to low-fat foods, reduced or minimum physical activity, and snacking combined with excessive screen time (computer, television, video games, cell phone). Family and cultural eating patterns as well as psychological factors play important roles; many families and cultures consider fat to be an indication of good health. It is common for obese children to have families that