Chapter 49
Introduction

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Epidemic of Obesity

More than 35 % of Americans are obese in the USA today and the prevalence of obesity continues to rise at an epidemic proportion. There has been a 74 % increase of obesity over the 10 years from 1991 to 2001 [1]. Over the period between 1999 and 2010, there have been observed differences between the rates of change of obesity prevalence between genders and races. Statistically significant increases are noted for non-Hispanic black women and Mexican American women as well as for men. Overall, the increases appear to be leveling off, however, there is no indication that the prevalence of obesity is declining [2]. Obesity epidemic is a reflection of the combination of excess caloric consumption with extra large portions of calorie dense food and the sedentary lifestyle that we have become accustomed to in our present society. As a consequence, obesity threatens our future with a significant increase in the prevalence of diabetes and cardiovascular morbidity and mortality. Our predisposition to obesity-related metabolic syndrome vary considerably among individuals and therefore, more personalized approaches are necessary to treat obesity. Some individuals are obese, yet they appear to be metabolically stable, while others develop many of the obesity-related metabolic complications, even with the same degree of obesity. Similar to other serious epidemic conditions, we must treat those obese individuals, with a high risk for metabolic complications, early and aggressively.

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T.F. Davies (ed.), *A Case-Based Guide to Clinical Endocrinology*,
DOI 10.1007/978-1-4939-2059-4_49

Endocrine Control of the Energy Balance System

Since the discovery of leptin in 1994, we have come to know that adipose tissue is a complex and metabolically active endocrine gland. Obesity is defined as the presence of excess adipose tissue. This excess, particularly in the visceral compartment, is associated with an increased risk for the metabolic syndrome. In addition, to metabolites such as free fatty acids (FFAs), adipose tissue secretes a variety of bioactive peptides, known as adipokines, active both at the local and systemic level [3].

These signals from adipose tissue work in concert with the rest of the energy homeostasis system. As Flier summarizes eloquently in his review, energy homeostasis involves both long-term and short-term signals [3]. Long-term afferent signals include leptin from adipose tissue and insulin from pancreatic beta cells. Short-term, meal-related afferent signals from the gut include inhibitors of appetite such as Peptide YY (PYY), Glucagon-like peptide-1 (GLP-1), and Cholecystokinin (CCK), and the stimulator of appetite such as ghrelin. These inputs are integrated within the brain, most importantly within the hypothalamic area and then processed into satiety or hunger signals as efferent output. The efferent elements of this system include those regulating the intensity of hunger and subsequent food seeking behavior. The efferent system also includes regulating the level of basal energy expenditure, energy expenditure determined by physical activity, and the levels of key circulating hormones such as insulin and glucocorticoids.

Since our survival used to be more acutely threatened by starvation than obesity, it comes as no surprise that the energy balance system is more robustly organized to respond to deficient energy intake and stores than to excess of energy. Our energy balance system is overwhelmed with the excess energy intake common in the present day, calorie-toxic environment. The system becomes more complicated when we take into account that our responses to food come not just from simple hunger or satiety, but with more variety of senses such as mood, appearance, environment, and more.

The Present and Future of Obesity Management

A comprehensive approach should be taken to derive at an individually appropriate treatment plan for obese patients. The intensity of therapy should be scaled based on patients' degree of obesity and coexisting metabolic risk factors. In the majority of cases, relatively small reductions in weight have a significant impact on obesity-related metabolic conditions, but some require further intervention. While more than two-thirds of adults in the USA are either trying to lose or maintain weight, the majority struggle to lose any weight. One explanation is that only 17.5 % were following the basic two key recommendations, which is both to eat fewer calories and to increase physical activity [4].

There is no one dietary method that is effective for everyone, but in most cases, weight loss achieved closely approximates a mathematically estimated weight loss, by the difference between energy intake and energy requirement for the individual. There are more than 4,000 successful long-term weight loss maintainers in the National Weight Control Registry with an average weight loss of 33 kg for more than 5.7 years. They share six common behavioral strategies, and those are (1) engaging in high levels of physical activity; (2) eating a diet that is low in calories and fat; (3) eating breakfast; (4) self-monitoring weight on a regular basis; (5) maintaining a consistent eating pattern; and (6) catching "slips" before they turn into larger regains [5]. As we begin to understand some of the varied physiological mechanisms relating to obesity, we will have more options to intervene. While we are far from curing obesity, we will discuss some of the specific and successful strategies toward approaching patients with obesity.

References

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