

Obesity and Metabolic Syndrome

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Obesity is one of the greatest twenty first century public health challenges. It is responsible for approximately 5 % of all deaths a year worldwide. Its global economic impact amounts to roughly \$2 trillion annually, which equates to 2.8 % of global gross domestic product. Currently, more than 2.1 billion people, approximately 30 % of the global population, are overweight or obese. More worryingly if the prevalence of obesity continues on its current trajectory, almost half of the world's adult population will be overweight or obese by 2030.

The chapters in this section summarise how obesity is defined and assessed, provide an overview of the biology of energy regulation, the health and economic consequences of obesity and its medical management. Chapter 1 outlines the epidemiologic and economic burdens of obesity, how overweight and obesity are classified and the current methodologies used to assess the degree of adiposity and its distribution. Chapters 2 and 3 summarise the biological basis of energy homeostasis. Chapter 2 outlines the main peripheral short and long-term signals that regulate energy balance, the central homeostatic and reward brain regions upon which these act and the key neurotransmitters implicated. This chapter also summarises how genetic and environmental factors influence body weight regulation. Chapter 3 reviews the physiological effects of the gut-derived orexigenic hormone, ghrelin, and the enteroendocrine L-cell derived satiety hormones peptide YY (PYY), glucagon-like peptide (GLP-1) and oxyntomodulin (OXM). Emphasising how an increased understanding of the biology of enteroendocrine cells may hold the key to novel therapeutic approaches for treating obesity and type 2 diabetes. Chapter 4 summarises the health consequences, societal and economic burdens of obesity and the complex bidirectional interplay between medical problems causing obesity and obesity causing medical problems. The final chapter in this section reviews the medical management of obesity, which aims to reduce morbidity and mortality while improving psychological well-being and social function. This chapter summarises the clinical assessment of obesity, available treatment options and how to target limited resources to those who will gain the greatest health benefits. It also highlights the importance of combined dietary and physical activity interventions, the utility of behavioural interventions for weight loss maintenance and the health benefits of modest (10 %) weight loss.

There is optimism that with continued advances in our understanding of the biology of energy regulation, in particular the mechanisms by which bariatric surgery mediates its beneficial weight loss and metabolic effects that non-surgical therapies, rivalling the health benefits of surgery are on the horizon.