

Contents

Foreword by Jeffrey Gray	ix
Acknowledgements	x
Introduction	1
1 Experimental techniques and procedures	3
Assessment of food intake and parallel measurements in unaltered conditions	3
Animal models	3
Food intake measurements in animal models	3
Self-intragastric and self-intravenous feeding	5
Parallel measurements in unaltered conditions	6
Food intake and parallel measurements in normal human subjects	7
Experimental manipulations	9
Diets	9
Gastrointestinal negative feedback	10
Systemic alterations	11
Central and peripheral nervous system	12
2 Basic facts and normal feeding	14
Basic concepts	14
Normal feeding in the steady-state condition	15
Free-feeding pattern in rats	16
Feeding schedules	19
Normal feeding in man	20
Normal feeding in the non-steady-state condition	21
Food deprivation	21
Ambient temperature and exercise	25
Pregnancy and lactation	27
3 Systemic and sensory stimulation to eat	28
The systemic or metabolic stimulus to eat or ‘hunger signal’	28
Temporal correlation	29

vi	<i>Contents</i>	
	Effects on meal initiation of manipulating the systemic stimulus	36
	Sensory-specific stimulation of eating	40
4	Determinants of meal size	48
	The origin of food-specific palatability	48
	The oro-gastrointestinal process of satiation	53
	Mouth	53
	Stomach	55
	Intestine	56
	Pre- and post-absorptive events in satiation and satiety	58
5	Body energy balance	60
	The steady-state condition	60
	Changing energy output	63
	Changing food intake	63
6	The regulation of body weight or body fat mass	68
	The liporegulatory mechanism and its impact on <i>ad libitum</i> feeding	69
	Reversibility of conditions of spontaneous or forced overweight and underweight	73
7	Developmental aspects	78
8	Brain mechanisms of hunger arousal and meal initiation	83
	The lateral hypothalamic feeding system	83
	Neuroanatomical evidence	83
	Electrical and chemical stimulation of the LH lesion	84
	LH lesion	86
	The brain target of the systemic and blood-borne hunger signal	88
	Brain mechanisms of palatability of foods	90
	Manifestations of palatability	90
	The sensory food reward	91
	Brain opiates and palatability of foods	91
	The brain mechanism of palatability learning	93
9	Brain mechanisms of satiation and meal size	96
	Non-involvement of the medial hypothalamus	96

<i>Contents</i>	vii
Role of the LH and connected structures in the satiation process	97
10 Brain mechanisms of body energy balance and of maintenance of fat mass	102
The hypothalamic regulation of body fat mass	102
Effect of electrical stimulation of the VMN	105
VMN and LH relationships	106
Sustained lipogenesis and impaired lipolysis after the VMH lesion	106
Role of hyperinsulinism and of sympathetic–parasympathetic imbalance	107
The origin of hyperphagia	108
The nature of the VMN liporegulatory mechanism	109
VMN glucose-sensitive sites	109
Brain insulin receptors	111
11 Nutrient-specific appetites	113
Manifestations of nutrient-specific appetites	113
Vitamin- and mineral-specific appetites	113
Macronutrient-specific appetites	114
Mechanisms of nutrient-specific appetites	118
Vitamins and minerals	118
High-fat diets	118
Protein intake	119
Conclusion	121
References	123
Index	151