Contents

Preface *xi*

PART 1 CONCEPTS AND PRINCIPLES **1**

1 Changing priorities for nutrition education **3**

Identification of the essential nutrients 3
Adequacy: the traditional priority in nutrition 5
The new priority: diet as a means to health promotion or disease prevention 7
Is intervention to induce dietary change justified? 16
Effecting dietary change 22
Concluding remarks 28

2 Food selection **29**

Introduction and aims of the chapter 29
The biological model of food 30
Dietary and cultural prejudice 31
Food classification systems 32
Non-nutritional uses of food 36
The hierarchy of human needs 38
A model of food selection: the hierarchy of availabilities model 39
Physical availability 41
Economic availability 42
Cultural availability 54
'Gatekeeper' limitations on availability 60

3 Methods of nutritional surveillance and research **63**

Introduction and aims of the chapter 63
Nutritional assessment and surveillance 63
Methods used to establish links between diet and disease 97

4 Dietary guidelines and recommendations **123**

The range of 'expert reports' and their consistency 123
Variations in the presentation of guidelines and recommendations 125
'Food' recommendations 127
Energy and body weight 128
Recommendations for fats, carbohydrates, protein and salt 128
Alcohol 130

How do current UK diets compare with 'ideal' intakes? 133
Other nutrients 134
Willingness to change 134
Some barriers to dietary change 136
Aids to food selection 137
Concluding remarks 141

5 Cellular energetics 143

Introduction and aims of the chapter 143
Overview of metabolism 143
Metabolism of glucose and the monosaccharides 145
Metabolism of fatty acids and glycerol 147
Metabolism of amino acids 148
The pentose phosphate pathway 148
An overview of macronutrient handling in the gut 149

PART 2 ENERGY, ENERGY BALANCE AND OBESITY 151

6 Introduction to energy aspects of nutrition 153

Sources of energy 153
Units of energy 153
How are energy requirements estimated? 153
Variation in average energy requirements: general trends 156
Energy content of foods 157
Sources of dietary energy by nutrient 157
Energy density 159
Nutrient density 162
The sources of dietary energy by food groups 162
Starvation 163
Eating disorders 167
Cancer cachexia 170

7 Energy balance and its regulation 173

Concept of energy balance 173
Is there physiological regulation of energy balance? 174
'Set point' theory 175
Is energy expenditure regulated? 175
External influences that affect food intake 178
Control of energy intake 178

8 Obesity 187

Defining obesity 187
Prevalence of obesity 187
Consequences of obesity 194
The metabolic syndrome or 'syndrome X' 201
Causes of obesity 201
Prevention and treatment of obesity in populations 210
Obesity treatment in individuals 213
More 'aggressive' treatments for obesity 217

PART 3 THE NUTRIENTS 223

9 Carbohydrates 225
Introduction 225
Nature and classification of carbohydrates 226
Dietary sources of carbohydrate 227
Sugars 228
Artificial sweeteners 230
Diet and dental health 232
Starches 235
Non-starch polysaccharide 237
Resistant starch 240
The glycaemic index 241
Does dietary fibre/non-starch polysaccharide protect against bowel cancer and heart disease? 241
Possible mechanisms by which diet may influence the risk of bowel cancer and heart disease 245

10 Protein and amino acids 247
Traditional scientific aspects of protein nutrition 247
Significance of protein in human nutrition 255
Concluding remarks 261

11 Fat 263
Nature of dietary fat 263
Types of fatty acids 264
Sources of fat in the diet 269
Roles of fat in the diet 272
Blood lipoproteins 278
Digestion, absorption and transport of dietary lipids 279
Transport of endogenously produced lipids 280
The diet–heart hypothesis 282
Current 'health images' of different dietary fats 284
The key tenets of the diet–heart hypothesis 289
Review of the evidence for the diet–heart hypothesis 289
Fish oils 295
Other natural oils used as supplements 299

12 The micronutrients 301
Scope of this chapter 301
Overview of dietary supplements 302
General micronutrient adequacy of British adults 303
Antioxidants and the oxidant theory of disease 308
Do high antioxidant intakes prevent heart disease, cancer and other chronic diseases? 313
Use of substances other than essential nutrients as dietary supplements 318

13 The vitamins 329
Some general concepts and principles 329
The individual vitamins 332

14 The minerals 357

Introduction 357
Chromium 358
Copper 359
Fluoride 360
Magnesium 360
Manganese 361
Molybdenum 361
Phosphorus 362
Potassium 362
Selenium 363
Zinc 364
Iodine and iodine deficiency diseases 365
Iron and iron deficiency anaemia 368
Calcium, diet and osteoporosis 373
Calcium and bone health 376
Salt and hypertension 383

PART 4 VARIATION IN NUTRITIONAL REQUIREMENTS AND PRIORITIES 395

15 Nutrition and the human lifecycle 397

Introduction 397
Nutritional aspects of pregnancy 399
Lactation 411
Infancy 412
Childhood and adolescence 422
The elderly 426

16 Nutrition as treatment 439

Diet as a complete therapy 439
Diet as a specific component of therapy 443
Malnutrition in hospital patients 449

17 Some other groups and situations 459

Vegetarianism 459
Racial minorities 465
Nutrition and physical activity 470

PART 5 THE SAFETY AND QUALITY OF FOOD 481

18 The safety and quality of food 483

Aims of the chapter 483
Consumer protection 483
Food poisoning and the microbiological safety of food 489
Bovine spongiform encephalopathy 502
Food processing 508
Chemical safety of food 512
Functional foods 520

Glossary 529
References 543
Index 565