Description

The International Textbook of Diabetes Mellitus has been a successful, well-respected medical textbook for almost 20 years, over 3 editions. Encyclopaedic and international in scope, the textbook covers all aspects of diabetes ensuring a truly multidisciplinary and global approach. Sections covered include epidemiology, diagnosis, pathogenesis, management and complications of diabetes and public health issues worldwide. It incorporates a vast amount of new data regarding the scientific understanding and clinical management of this disease, with each new edition always reflecting the substantial advances in the field. Whereas other diabetes textbooks are primarily clinical with less focus on the basic science behind diabetes, ITDM’s primary philosophy has always been to comprehensively cover the basic science of metabolism, linking this closely to the pathophysiology and clinical aspects of the disease.

Edited by four world-famous diabetes specialists, the book is divided into 13 sections, each section edited by a section editor of major international prominence. As well as covering all aspects of diabetes, from epidemiology and pathophysiology to the management of the condition and the complications that arise, this fourth edition also includes two new sections on NAFLD, NASH and non-traditional associations with diabetes, and clinical trial evidence in diabetes.

This fourth edition of an internationally recognised textbook will once again provide all those involved in diabetes research and development, as well as diabetes specialists with the most comprehensive scientific reference book on diabetes available.

Table of Contents

Contributors xi

Preface xxiii

Section I: Epidemiology

1 Classification of diabetes mellitus and other categories of glucose intolerance 3
   Dianna J. Magliano, Paul Zimmet and Jonathan E. Shaw
Section II: Physiology of pancreatic function

4 Development and maintenance of the islet β cell 55
*Teresa L. Mastracci, Raghavendra G. Mirmira and Ryan M. Anderson

5 Pancreatic morphology in normal and diabetic states 69
*Rebecca L. Hull and Steven E. Kahn

6 Insulin gene expression and biosynthesis 82
*Vincent Poitout, Roland Stein and Christopher J. Rhodes

7 β-Cell biology of insulin secretion 96
*Susumu Seino, Tadao Shibasaki and Kohtaro Minami

8 Normal β-cell function 108
*Andrea Natali, Stefano Del Prato and Andrea Mari

9 Neuropeptides and islet hormone secretion 125
*Bo Ahrén

10 Biosynthesis secretion and action of glucagon 136
*Pierre J. Lefebvre

11 Incretin physiology in health and disease 145
*Juris J. Meier and Michael A. Nauck

Section III: Normal physiology of insulin action

12 Mechanisms of insulin signal transduction 163
*Paul R. Langlais, Lawrence J. Mandarino and W. Timothy Garvey

13 Regulation of glucose metabolism in liver 193
*Shawn C. Burgess

14 Insulin actions in vivo: glucose metabolism 211
*Ele Ferrannini and Ralph A. DeFronzo

15 Measuring insulin action in vivo 234
*Richard N. Bergman and Marilyn Ader

16 Protein metabolism in health and diabetes 250
*Elena Volpi and Jared M. Dickinson
17 Lipid and lipoprotein metabolism hypolipidemic agents and therapeutic goals 262
Gisette Reyes-Soffer and Henry N. Ginsberg

18 Metabolomics: applications in type 2 diabetes mellitus and insulin resistance 275
Sean H. Adams and John W. Newman

**Section IV: NAFLD NASH and non-traditional associations with diabetes**

19 Pathogenesis of nonalcoholic fatty liver disease (NAFLD) 283
Hannele Yki-Järvinen

20 Treatment of nonalcoholic fatty liver disease (NAFLD) and nonalcoholic steatohepatitis (NASH) 292
Fernando Bril, Kwame Ntim, Romina Lomonaco and Kenneth Cusi

21 Type 2 diabetes and cancer 306
Emily Jane Gallagher, Ruslan Novosyadlyy and Derek LeRoith

22 Diabetes and sleep apnea 316
Abd A. Tahrani

**Section V: Pathogenesis**

23 The insulin resistance syndrome 339
Naveed Sattar, Paul Welsh and David Preiss

24 β-Cell mass and function in human type 2 diabetes 354
Piero Marchetti and Ele Ferrannini

25 Pathogenesis of type 2 diabetes mellitus 371
Ralph A. DeFronzo

26 The genetics of type 2 diabetes 401
Emma Ahlqvist and Leif Groop

27 Glucose toxicity 413
Hannele Yki-Järvinen and Donald A. McClain

28 Monogenic disorders of the β cell 426
Ali J. Chakera and Andrew T. Hattersley

29 Immunopathogenesis of type 1 diabetes in Western society 442
Alberto Pugliese

30 Molecular genetics of type 1 diabetes 454
M. Ann Kelly, Simon D. Rees, Anthony H. Barnett and Stephen C. Bain

**Section VI: Obesity**
31 The relationship between obesity and type 2 diabetes—the role of gut factors 469
Daniel S. Hsia and William T. Cefalu

32 The role of energy metabolism in the regulation of energy balance 479
Charmaine S. Tam and Eric Ravussin

33 Treatment of obesity: lifestyle and pharmacotherapy 489
Arne Astrup

34 Treatment of obesity: bariatric surgery 505
Karl J. Neff Ele Ferrannini and Carel W. le Roux

35 Animal models of obesity and type 2 diabetes 519
David A. York, Mie Jung, Park-York and Timothy Gilbertson

36 The role of the hypothalamus in the maintenance of energy balance and peripheral glucose control 529
Luis Varela and Tamas L. Horvath

Section VII: Clinical trial evidence in diabetes

37 Prevention of type 1 diabetes 541
Jay S. Skyler

38 Prevention of type 2 diabetes 550
Thomas Yates and Melanie J. Davies

39 Prevention of diabetic microvascular complications 564
Alice P.S. Kong and Juliana C.N. Chan

Section VIII: Management of diabetes: diet exercise and drugs

40 Dietary management of diabetes mellitus in Europe and North America 577
Jim I. Mann and Alexandra Chisholm

41 Exercise 589
Henrik Galbo and Erik A. Richter

42 Sulfonylureas and meglitinides: insights into physiology and translational clinical utility 615
Harold E. Lebovitz and Arne Melander

43 Metformin and other biguanides: pharmacology and therapeutic usage 641
Susan L. Samson and Alan J. Garber

44 PPAR agonists in the treatment of diabetes 657
Sunder Mudaliar and Robert R. Henry

45 α-Glucosidase inhibitors 673
Josée Leroux-Stewart, Rémi Rabasa-Lhoret and Jean-Louis Chiasson
Section IX: Management of diabetes: monitoring and other interventions

46 Combination therapy in type 2 diabetes mellitus 686
Muhammad Abdul-Ghani, Ralph A. DeFronzo and Roy Eldor

47 New drugs for the treatment of diabetes mellitus 709
Clifford J. Bailey

48 Incretin-based therapies 726
Michael A. Nauck and Juris J. Meier

49 Insulin pumps 745
Dace L. Trence and Irl B. Hirsch

50 Innovative therapies in diabetes: coleselam and bromocriptine 758
Shamsa Ali and Vivian Fonseca

Section X: Management of diabetes: glucose and lipid monitoring specific subgroups

51 Implantable pumps and artificial and bio-artificial pancreas system 767
William V. Tamborlane and Miladys M. Palau-Collazo

52 Pancreas and islet transplantation 774
R. Paul Robertson

53 Hypoglycemia and other complications of insulin therapy 783
Stephanie A. Amiel

54 Diabetic ketoacidosis and hyperosmolar state 799
Abbas E. Kitabchi, Guillermo E. Umpierrez and Mary Beth Murphy

Section XI: Complications of diabetes: general and microvasular

55 Type 2 diabetes in obese adolescents: pathophysiology and treatment 817
Grace Kim and Sonia Caprio

56 Diabetes in pregnancy 823
Yoel Toledano, Eran Hadar and Moshe Hod

57 Aging and diabetes mellitus 836
Hermes Florez, Jorge Ruiz and Medha Munshi

58 Psychological problems and management of patients with diabetes mellitus 846
Alan M. Delamater, Ashley Marchante, and Jennifer Hernandez

59 Glycated hemoglobin serum proteins and other markers as tools for monitoring 853
Susan M. Gerber, Douglas F. Stickle, Intekhab Ahmed, and Serge A. Jabbour

Section XII: Complications of diabetes: general and microvasular

60 Pathogenesis of diabetic microvascular complications 875
Josephine M. Forbes and Brooke Harcourt
Section XII: Complications of diabetes: macrovascular

69 Epidemiology of macrovascular disease and hypertension in diabetes mellitus 1007
Jaakko Tuomilehto, Daiva Rastenyte, Qing Qiao, Noél C. Barengo and Karl Matz

70 Atherogenesis coronary heart disease and insulin resistance syndrome in diabetes 1031
Barak Zafrir and Jorge Plutzky

71 Endothelial function and metabolic syndrome 1046
Xinpu Chen and Sridevi Devaraj

72 Hemostatic abnormalities in diabetes mellitus 1051
R.A. Ajjan and Peter J. Grant

73 Clinical features and treatment of coronary heart disease in diabetes 1064
Eberhard Standl, Michael Erbach, Markolf Hanefeld, Oliver Schnell, Bernd Stratmann and Diethelm Tschoepe

74 Arterial hypertension in diabetes: etiology and treatment 1079
Colleen Flynn and George Bakris

75 Peripheral vascular and cerebrovascular disease in diabetes mellitus 1091
Debabrata Mukherjee

Section XIII: Diabetes and public health
The diabetes challenge: from human and social rights to the empowerment of people with diabetes 1105

C.T. Di Iorio, Fabrizio Carinci and M. Massi Benedetti

The economics of diabetes care: a global perspective 1113

Rhys Williams