

PREFACE

Diabetes, especially Type 2 diabetes, has reached epidemic proportions in the United States. Because of the greater emphasis on solving the problems associated with this disease, it is critical to bring forward an up-to-date review of the basic science aspects. Accordingly, this volume focuses on insulin as the pivotal hormone, the understanding of which is essential for fundamental laboratory approaches to the clinical problem. Although the subject of diabetes occurs in this treatise, the emphasis is upon the basic science of the hormone, insulin, and also IGFs, themselves. We need to know about the three-dimensional structure, receptors, signaling, secretion mechanisms, regulation and relationships to other factors in the body. These considerations and others are highlighted in this book.

The newer structural aspects of insulin are topics at the beginning: F. Shabanpoor, F. Separovic and J.D. Wade start off with "The human insulin superfamily of polypeptide hormones" followed by "The structure and function of insulin: decoding the TR transition" by M.A. Weiss. Signaling from the insulin receptor and related subjects come next. "Molecular mechanisms of differential intracellular signaling from the insulin receptor" is reviewed by M. Jensen and P. De Meyts. M. Genua, G. Pandini, M.F. Cassarino, R.L. Messina and F. Frasca offer "C-ABL and insulin receptor signaling". "CXCL14 and insulin action" is reported by T. Hara and Y. Nakayama. J. Xu and J.L. Messina write on "Crosstalk between growth hormone and insulin signaling".

GLUT4, a key glucose transporter, is the topic of the following. "Intracellular retention and insulin-stimulated mobilization of GLUT4 glucose transporters", by B.R. Rubin and J.S. Bogan and "Compartmentalization and regulation of insulin signaling to GLUT4 by the cytoskeleton" by C.A. Eyster and A.L. Olson.

A number of subjects are addressed in the papers that follow. "Nutrient modulation of insulin secretion" is reviewed by N. Torres, L. Noriega and A.R. Tovar. J.M. Muretta reports "How insulin regulates glucose transport in adipocytes". "Spatio-temporal dynamics of phosphatidylinositol-3,4,5-trisphosphate signaling" is the work of A. Tengholm and O. Idevall-Hagren. S. Boura-Halfon and Y. Zick introduce "Serine kinases of insulin receptor substrate proteins". X.J. Sun and F. Liu report "Phosphorylation of IRS-proteins: Yin-Yang regulation of insulin signaling". "IRS-2 and its involvement in diabetes and aging" is reviewed by J. Zhang and T.-Q. Sun. "Glucose-dependent insulinotropic polypeptide (gastric inhibitory

polypeptide; GIP)" by C.H.S. McIntosh, S. Widenmaier and S.-J. Kim and "Insulin granule biogenesis, trafficking and exocytosis" by J.C. Hou and J.E. Pessin, follow. The next subject is "Glucose, regulator of survival and phenotype of pancreatic beta cells" by G.A. Martens and D. Pipeleers. Several offerings follow: "Matrix metalloproteinases, T cell homing and beta-cell mass in type 1 diabetes" by A.Y. Savinov and A.Y. Strongin; "Role of Wnt signaling in the development of type 2 diabetes" by M. Bordonaro; "Retinal insulin receptor signaling in hyperosmotic stress" by R.V.S. Rajala, I. Ivanovic and A.K. Dilly; "Interleukin-6 and insulin resistance" by J.-H. Kim, R.A. Bachmann and J. Chen; "Structure, function and regulation of insulin-degrading enzyme" by R.E. Hulse, L.A. Ralat and W.-J. Tang; "Modification of androgen receptor function by IGF-1 signaling: implications in the mechanism of refractory prostate carcinoma" by T. Yanase and W.-Q. Fan; "Insulin-like growth factor-2/mannose-6 phosphate receptors" by H.M. El-Shewy and L.M. Luttrell, and lastly, "Interaction of IGF-II with the IGF2R/cation-independent mannose-6-phosphate receptor: mechanism and biological outcomes" by B.J. Jones and B.E. Forbes.

The structure on the cover is a cartoon of the insulin receptor taken from *Human Biochemistry and Disease*, Academic Press/Elsevier, 2008.

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Gerald Litwack
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