Vitamin D and Rickets
Endocrine Development

Vol. 6

Series Editor

Martin O. Savage  London
Vitamin D and Rickets

Volume Editor

Ze’ev Hochberg  Haifa

66 figures, 5 in color, and 23 tables, 2003
Contents

VII Foreword
Savage, M.O. (London)

IX Preface
Hochberg, Z. (Haifa)

1 Introduction. Rickets – Past and Present
Hochberg, Z. (Haifa)

14 Normal Mineral Homeostasis. Interplay of Parathyroid Hormone and Vitamin D
Levine, M.A. (Baltimore, Md.)

34 Maternal, Fetal and Neonatal Vitamin D and Calcium Metabolism during Pregnancy and Lactation
Weisman, Y. (Tel-Aviv)

50 Vitamin D Receptor

69 The Rachitic Bone
Rauch, F. (Montréal)

80 Imaging of Rachitic Bone
States, L.J. (Philadelphia, Pa.)

93 Vitamin D Deficiency Rickets
Shaw, N.J. (Birmingham)

105 Calcium-Deficiency Rickets
Thacher, T.D. (Jos)
126 Hypophosphatemic Rickets
  Drezner, M.K. (Madison, Wisc.)

156 Vitamin D Biosynthesis and Vitamin D 1α-Hydroxylase Deficiency
  Miller, W.L.; Portale, A.A. (San Francisco, Calif.)

175 Hereditary 1,25-Dihydroxyvitamin D-Resistant Rickets
  Malloy, P.J.; Feldman, D. (Stanford, Calif.)

200 Rickets in Transgenic Animals
  Carmeliet, G.; Van Cromphaut, S.; Maes, C.; Raemaekers, T.; Bouillon, R. (Leuven)

220 Rickets in Developing Countries
  Bereket, A. (Istanbul)

233 Prophylactic Vitamin D Supplementation
  Calikoglu, A.S.; Davenport, M.L. (Chapel Hill, N.C.)

259 Consensus Development for the Supplementation of Vitamin D in
    Childhood and Adolescence
  Hochberg, Z. (Haifa); Bereket, A. (Istanbul); Davenport, M. (Chapel Hill, N.C.);
  Delemarre-Van de Waal, H.A. (Amsterdam); De Schepper, J. (Brussels);
  Levine, M.A. (Baltimore, Md.); Shaw, N. (Birmingham); Schoenau, E. (Cologne);
  van Coeverden, S.C. (Amsterdam); Weisman, Y. (Tel Aviv); Zadik, Z. (Rehovot) on
  behalf of the European Society for Paediatric Endocrinology (ESPE) Bone Club

283 Abbreviations

285 Subject Index
Foreword

This volume is a very welcome addition to the *Endocrine Development* series because it brings a much needed focus to the importance of Rickets as a continuing global health problem and presents new scientific information underlying its pathogenesis. I am grateful to Ze’ev Hochberg and his distinguished cast of contributors, who are experts in clinical paediatrics, vitamin D and calcium physiology, molecular biology and bone metabolism. The result of their contributions is a volume of high quality, which bridges scientific advances and clinical medicine, thus maintaining the aim of this series. The book comprises a fascinating range of current knowledge from the original clinical descriptions of Rickets to the latest molecular advances in vitamin D and calcium physiology and pathophysiology.

This volume aims to be helpful to both scientists and clinicians who are still grappling with the difficult challenge of Rickets in the 21st century.

*Martin O. Savage*

London, April 2003
Preface

In 1650, Francis Glisson wrote his first book on rickets, ‘De Rachitide Sive Morbo Puerili, Qui Vulgo’. In 1668, Glisson felt that so much had been revealed in the previous 18 years that he wrote a second book on the same topic ‘A Treatise of the Rickets Being a Disease Common to Children’. Ever since the 17th century discoveries, books on rickets have been published periodically; the last of them being ‘Rickets’, edited by Francis Glorieux and published in 1991. In the footsteps of Glisson, I can humbly assert that so much has been revealed in the past 12 years that the present book on the same topic contains scores of recent revelations that shed innovative light on a long-standing theme.

Rickets is a disease of the growing child and it is illuminated in this volume from different perspectives. The basis for understanding rickets is rooted in the concepts of mineral metabolism and its control mechanisms in the growing fetus, infant and child. We now understand that rickets is not only vitamin D deficiency, but we also realize that vitamin D and calcium deficiency are still prevalent in developing countries, as well as in affluent societies, where children are not exposed to as much sunlight as they need. The rapid growth of molecular biology has been exemplified in the application of subcellular technologies to studying vitamin D and rickets in human and animal models.

Hopefully, this volume will provide an integration of important basic and clinical advances in our understanding of rickets.

Ze’ev Hochberg, Haifa