# Contents

Dedication .......................................................... v  
In Memoriam ...................................................... vii  
Series Editor Introduction ........................................ ix  
Preface ................................................................... xiii  
Contributors .......................................................... xxi

## Part I: Introduction and Basic Biology

1. Vitamin D and Health: Evolution, Biologic Functions, and Recommended Dietary Intakes for Vitamin D 
   *Michael F. Holick*  
   3

2. Photobiology of Vitamin D 
   *Tai C. Chen, Zhiren Lu, and Michael F. Holick*  
   35

3. The Functional Metabolism and Molecular Biology of Vitamin D Action 
   *Lori A. Plum and Hector F. DeLuca*  
   61

4. Metabolism and Catabolism of Vitamin D, Its Metabolites and Clinically Relevant Analogs 
   *Glenville Jones*  
   99

5. The Molecular Biology of the Vitamin D Receptor 
   *Diane R. Dowd and Paul N. MacDonald*  
   135

6. VDR and RXR Subcellular Trafficking 
   *Julia Barsony*  
   153

7. Mechanism of Action of 1,25-Dihydroxyvitamin D₃ on Intestinal Calcium Absorption and Renal Calcium Transport 
   *Dare Ajibade, Bryan S. Benn, and Sylvia Christakos*  
   175

8. Biological and Molecular Effects of Vitamin D on Bone 
   *Martin A. Montecino, Jane B. Lian, Janet L. Stein, Gary S. Stein, André J. van Wijnen, and Fernando Cruzat*  
   189

9. Biological and Molecular Effects of Vitamin D on the Kidney 
   *Adriana S. Dusso and Masanori Tokumoto*  
   211
10 Vitamin D and the Parathyroids ................................... 235
  Justin Silver and Tally Naveh-Many

11 Diversity of Vitamin D Target Genes ........................... 255
  Carsten Carlberg

PART II: NON-SKELETAL/FUNCTIONS OF VITAMIN D

12 Extrarenal Synthesis of 1,25-Dihydroxyvitamin D and Its Health Implications .... 277
  Daniel D. Bikle

13 Vitamin D and the Innate Immunity ................................... 297
  Philip T. Liu, Martin Hewison, and John S. Adams

14 Vitamin D and Colon Cancer ........................................... 311
  Heide S. Cross and Meinrad Peterlik

15 Mechanisms of Resistance to Vitamin D Action in Human Cancer Cells .......... 325
  María Jesús Larriba and Alberto Muñoz

16 Vitamin D and the Brain: A Neuropsychiatric Perspective .............................. 335
  Louise Harvey, Thomas Burne, Xiaoying Cui, Alan Mackay-Sim, Darryl Eyles, and John McGrath

17 Vitamin D Modulation of Adipocyte Function .................................... 345
  Michael B. Zemel and Xiaocun Sun

PART III: VITAMIN D STATUS – GLOBAL ANALYSIS

18 Determinants of Vitamin D Intake ......................................... 361
  Mona S. Calvo and Susan J. Whiting

19 25-Hydroxyvitamin D Assays and Their Clinical Utility .................................. 383
  N. Binkley and G. Lensmeyer

20 Health Disparities and Vitamin D ......................................... 401
  Douglass Bibuld

21 Vitamin D Deficiency in Canada ............................................ 425
  David A. Hanley

22 Vitamin D Deficiency and Its Health Consequences in Northern Europe ......... 435
  Leif Mosekilde

23 Vitamin D Deficiency and Consequences for the Health of People in Mediterranean Countries ........................................ 453
  Jose Manuel Quesada-Gomez and Manuel Díaz-Curiel

24 Vitamin D Deficiency in the Middle East and Its Health Consequences ......... 469
  Ghada El-Hajj Fuleihan

25 Vitamin D Deficiency in the Middle East and Its Health Consequences for Adults ........................................ 495
  Samer El-Kaissi and Suphia Sherbeeni
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Author(s)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Vitamin D Deficiency and Its Health Consequences in India</td>
<td>R.K. Marwaha and R. Goswami</td>
<td>529</td>
</tr>
<tr>
<td>28</td>
<td>Vitamin D Deficiency, Rickets, and Fluorosis in India</td>
<td>C. V. Harinarayan and Shashank R. Joshi</td>
<td>543</td>
</tr>
<tr>
<td>29</td>
<td>Vitamin D in Asia</td>
<td>Tim Green and Bernard Venn</td>
<td>563</td>
</tr>
<tr>
<td>30</td>
<td>Vitamin D Deficiency and Its Health Consequences in New Zealand</td>
<td>Mark J. Bolland and Ian R. Reid</td>
<td>589</td>
</tr>
<tr>
<td>31</td>
<td>Toxicity of Vitamin D</td>
<td>Reinhold Vieth</td>
<td>603</td>
</tr>
<tr>
<td></td>
<td><strong>PART IV: HEALTH CONSEQUENCES OF VITAMIN D DEFICIENCY AND RESISTANCE ON MUSCULOSKELETAL HEALTH</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Vitamin D Deficiency in Pregnancy and Lactation and Health Consequences</td>
<td>Sarah N. Taylor, Carol L. Wagner, and Bruce W. Hollis</td>
<td>615</td>
</tr>
<tr>
<td>33</td>
<td>Vitamin D Deficiency in Children and Its Health Consequences</td>
<td>Amy D. DiVasta, Kristen K. van der Veen, and Catherine M. Gordon</td>
<td>633</td>
</tr>
<tr>
<td>34</td>
<td>Dietary Calcium Deficiency and Rickets</td>
<td>John M. Pettifor, Philip R. Fischer, and Tom D. Thacher</td>
<td>651</td>
</tr>
<tr>
<td>35</td>
<td>Vitamin D in Fracture Prevention and Muscle Function and Fall Prevention</td>
<td>Heike Bischoff-Ferrari</td>
<td>669</td>
</tr>
<tr>
<td>36</td>
<td>Inherited Defects of Vitamin D Metabolism</td>
<td>Marie B. Demay</td>
<td>679</td>
</tr>
<tr>
<td>37</td>
<td>Molecular Defects in the Vitamin D Receptor Associated with Hereditary 1,25-Dihydroxyvitamin D-Resistant Rickets (HVDRR)</td>
<td>Peter J. Malloy and David Feldman</td>
<td>691</td>
</tr>
<tr>
<td>38</td>
<td>Receptor-Independent Vitamin D Resistance in Subhuman and Human Primates</td>
<td>John S. Adams, Hong Chen, Thomas S. Lisse, Rene F. Chun, and Martin Hewison</td>
<td>715</td>
</tr>
<tr>
<td>39</td>
<td>25-Hydroxyvitamin D-1α-Hydroxylase: Studies in Mouse Models and Implications for Human Disease</td>
<td>David Goltzman</td>
<td>729</td>
</tr>
</tbody>
</table>
PART V: SUNLIGHT, VITAMIN D AND CANCER

40 The Health Benefits of Solar Irradiance and Vitamin D and the Consequences of Their Deprivation ................................................................. 745
   William B. Grant

41 Vitamin D Status, Solar Radiation and Cancer Prognosis ................................................................. 765
   Johan Moan, Øyvind Sverre Bruland, Arne Dahlback, Asta Juzeniene, and Alina Carmen Porojnicu

42 The Epidemiology of Vitamin D and Cancer Risk ................................................................. 777
   Edward Giovannucci

43 Vitamin D Deficiency and the Epidemiology of Prostate Cancer ................................................................. 797
   Gary G. Schwartz

44 Vitamin D for Cancer Prevention and Survival ................................................................. 813
   Edward D. Gorham, Sharif B. Mohr, Frank C. Garland, and Cedric F. Garland

45 The Anti-cancer Effect of Vitamin D: What Do the Randomized Trials Show? ................................................................. 841
   Joan M. Lappe and Robert P. Heaney

46 Sunlight, Skin Cancer, and Vitamin D ................................................................. 851
   Jörg Reichrath

PART VI: VITAMIN D DEFICIENCY AND CHRONIC DISEASE

47 Vitamin D and the Risk of Type 1 Diabetes ................................................................. 867
   Elina Hyppönen

48 Vitamin D and Multiple Sclerosis ................................................................. 881
   Alberto Ascherio and Kassandra L. Munger

49 Vitamin D and Type 2 Diabetes ................................................................. 895
   Myrto Eliades and Anastassios G. Pittas

50 Role of Vitamin D for Cardiovascular Health ................................................................. 921
   Robert Scragg

51 Vitamin D, Renin, and Blood Pressure ................................................................. 937
   Yan Chun Li

52 Role of Vitamin D and Vitamin D Analogs for Bone Health and Survival in Chronic Kidney Disease ................................................................. 955
   Ishir Bhan, Hector Tamez, and Ravi Thadhani

53 Role of Vitamin D and Ultraviolet Radiation in Chronic Kidney Disease ................................................................. 967
   Rolfdieter Krause

54 Role of Vitamin D in Rheumatoid Arthritis ................................................................. 985
   Linda A. Merlino

55 Vitamin D, Respiratory Infections, and Obstructive Airway Diseases ................................................................. 997
   Carlos A. Camargo Jr, Adit A. Ginde, and Jonathan M. Mansbach
PART VII: CLINICAL USES OF VITAMIN D ANALOGUES

56  Treatment of Immunomediated Diseases by Vitamin D Analogs .......................... 1025
    Luciano Adorini

57  Clinical Utility of 1,25-Dihydroxyvitamin D₃ and Its Analogues
    for the Treatment of Psoriasis ........................................ 1043
    Jörg Reichrath and Michael F. Holick

58  Affinity Alkylating Vitamin D Analogs as Molecular Probes
    and Therapeutic Agents ................................................. 1061
    Rahul Ray

59  Anti-inflammatory Activity of Calcitriol That Contributes
    to Its Therapeutic and Chemopreventive Effects in Prostate Cancer ............. 1087
    Aruna V. Krishnan and David Feldman

Subject Index ............................................................... 1105
Vitamin D
Physiology, Molecular Biology, and Clinical Applications
Holick, M.F. (Ed.)
2010, XXVI, 1160 p. 241 illus., 7 illus. in color.,
Hardcover
ISBN: 978-1-60327-300-8
A product of Humana Press