

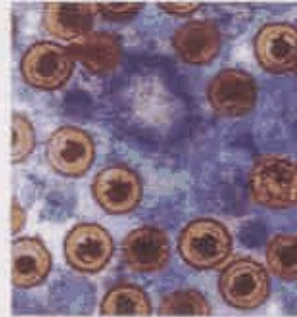
Seventh Edition  
Volume One

# Fitzpatrick's

# DERMATOLOGY

# IN GENERAL

# MEDICINE



KLAUS WOLFF • LOWELL A. GOLDSMITH  
STEPHEN I. KATZ • BARBARA A. GILCHREST  
AMY S. PALLER • DAVID J. LEFFELL



# CONTENTS

Contributors . . . . .	xvii
Preface . . . . .	xxxi
Acknowledgments . . . . .	xxxv

## Volume One

<b>PART 1</b>	1
<b>INTRODUCTION</b>	
<b>SECTION 1. General Considerations . . . . .</b>	<b>3</b>
<b>1 The Epidemiology and Burden of Skin Disease . . . . .</b>	<b>3</b>
<i>Martin A. Weinstock, MD, PhD, and Mary-Margaret Chren, MD</i>	
<b>2 Evidence-Based Dermatology . . . . .</b>	<b>8</b>
<i>Michael Bigby, MD, Rosamaria Corona, DSc, MD, and Moyses Szklo, MD, MPH, DrPH</i>	
<b>3 Public Health in Dermatology . . . . .</b>	<b>18</b>
<i>Hywel C. Williams, MSc, PhD, FRCP, Sinéad Langan, MRCP, and Carsten Flohr, MRCPC</i>	
<b>SECTION 2: Approach to Dermatologic Diagnosis . . . . .</b>	<b>23</b>
<b>4 Structure of Skin Lesions and Fundamentals of Clinical Diagnosis . . . . .</b>	<b>23</b>
<i>Amit Garg, MD, Niteki A. Levin, MD, PhD, and Jeffrey D. Bernhard, MD</i>	
<b>5 Diagnostic Procedures and Devices . . . . .</b>	<b>40</b>
<i>Alon Scope, MD, and Allan C. Halpern, MD</i>	
<b>6 Basic Pathologic Reactions of the Skin . . . . .</b>	<b>43</b>
<i>Martin C. Mihm, Jr., MD, Abdul-Ghani Kibbi, MD, FACP, and Klaus Wolff, MD, FRCP</i>	
<b>SECTION 3: Overview of Biology, Development, and Structure of Skin . . . . .</b>	<b>57</b>
<b>7 Development and Structure of Skin . . . . .</b>	<b>57</b>
<i>David H. Chu, MD, PhD</i>	
<b>8 Genetics in Relation to the Skin . . . . .</b>	<b>73</b>
<i>John A. McGrath, MD, and W. H. Irwin McLean, MD</i>	

<b>9 Basic Science Approaches to the Pathophysiology of Skin Disease . . . . .</b>	<b>87</b>
<i>Paul R. Bergstresser, MD</i>	

<b>PART 2</b>	93
<b>DISORDERS PRESENTING IN SKIN AND MUCOUS MEMBRANES</b>	
<b>SECTION 4. Inflammatory Disorders Based on T-Cell Reactivity and Dysregulation . . . . .</b>	<b>95</b>
<b>10 Innate and Adaptive Immunity in the Skin . . . . .</b>	<b>95</b>
<i>Robert L. Modlin, MD, Jenny Kim, MD, PhD, Dieter Maurer, MD, Christine Bangert, MD, and Georg Stingl, MD</i>	
<b>11 Cytokines . . . . .</b>	<b>115</b>
<i>Ifor R. Williams, MD, PhD, Benjamin E. Rich, PhD, and Thomas S. Kupper, MD</i>	
<b>12 Chemokines . . . . .</b>	<b>127</b>
<i>Sam T. Hwang, MD, PhD</i>	
<b>13 Allergic Contact Dermatitis . . . . .</b>	<b>135</b>
<i>David E. Cohen, MD, MPH, and Sharon E. Jacob, MD</i>	
<b>14 Atopic Dermatitis (Atopic Eczema) . . . . .</b>	<b>146</b>
<i>Donald Y. M. Leung, MD, PhD, Lawrence F. Eichenfield, MD, and Mark Boguniewicz, MD</i>	
<b>15 Nummular Eczema and Lichen Simplex Chronicus/Prurigo Nodularis . . . . .</b>	<b>158</b>
<i>Susan Burgin, MD</i>	
<b>16 Vesicular Palmoplantar Eczema . . . . .</b>	<b>162</b>
<i>Daven N. Doshi, MD, and Alexa B. Kimball, MD, MPH</i>	
<b>17 Autosensitization Dermatitis . . . . .</b>	<b>167</b>
<i>Donald V. Belsito, MD</i>	
<b>18 Psoriasis . . . . .</b>	<b>169</b>
<i>Johann E. Gudjonsson, MD, PhD, and James T. Elder, MD</i>	
<b>19 Psoriatic Arthritis . . . . .</b>	<b>194</b>
<i>Robert Winchester, MD</i>	

<b>20</b>	Reactive Arthritis . . . . .	207
	<i>Andrew Keat, MD</i>	
<b>21</b>	Pustular Eruptions of Palms and Soles . . . . .	215
	<i>Ulrich Mrowietz, MD</i>	
<b>22</b>	Seborrheic Dermatitis . . . . .	219
	<i>Gerd Plewig, MD, and Thomas Jansen, MD</i>	
<b>23</b>	Exfoliative Dermatitis . . . . .	225
	<i>Jane Margaret Grant-Kels, MD, Megan L. Bernstein, MD, and Marti J. Rothe, MD</i>	
<b>24</b>	Pityriasis Rubra Pilaris . . . . .	232
	<i>Daniela Bruch-Gerharz, MD, and Thomas Ruzicka, MD</i>	
<b>25</b>	Parapsoriasis and Pityriasis Lichenoides . . . . .	236
	<i>Gary S. Wood, MD, Chung-Hong Hu, MD, and Andrea L. Garrett, MD</i>	
<b>26</b>	Lichen Planus . . . . .	244
	<i>Mark R. Pittelkow, MD, and Mazen S. Daoud, MD</i>	
<b>27</b>	Lichen Nitidus . . . . .	255
	<i>Mark R. Pittelkow, MD, and Mazen S. Daoud, MD</i>	
<b>28</b>	Graft-Versus-Host Disease . . . . .	258
	<i>Misty T. Sharp, MD, and Thomas D. Horn, MD</i>	
<b>29</b>	Skin Disease in Acute and Chronic Immunosuppression . . . . .	267
	<i>Lynda Kauls, MD, and Andrew Blauvelt, MD</i>	

**SECTION 5. Inflammatory Diseases  
Based on Neutrophils and Eosinophils . . . . . 279**

<b>30</b>	Regulation of the Production and Activation of Neutrophils and Eosinophils . . . . .	279
	<i>Steven M. Holland, MD, James Loveless, MD, and Lisa A. Beck, MD</i>	
<b>31</b>	Acute Febrile Neutrophilic Dermatosis (Sweet Syndrome) . . . . .	289
	<i>Philip R. Cohen, MD, Herbert Hönigsmann, MD, and Razelle Kurzrock, MD, FACP</i>	
<b>32</b>	Pyoderma Gangrenosum . . . . .	296
	<i>Frank C. Powell, MD, and Bridget C. Hackett, MRCPI</i>	
<b>33</b>	Granuloma Faciale . . . . .	302
	<i>Darius R. Mehregan, MD, and David A. Mehregan, MD</i>	
<b>34</b>	Sub-Corneal Pustular Dermatitis (Sneddon-Wilkinson Disease) . . . . .	305
	<i>Franz Trautinger, MD, and Herbert Hönigsmann, MD</i>	
<b>35</b>	Eosinophils in Cutaneous Diseases . . . . .	307
	<i>Kristin M. Leiferman, MD, and Margot S. Peters, MD</i>	

**SECTION 6. Inflammatory Diseases  
Based on Abnormal Humoral Reactivity  
and Other Inflammatory Diseases . . . . . 319**

<b>36</b>	Humoral Immunity and Complement . . . . .	319
	<i>Lela A. Lee, MD</i>	
<b>37</b>	Urticaria and Angioedema . . . . .	330
	<i>Allen P. Kaplan, MD</i>	
<b>38</b>	Erythema Multiforme . . . . .	343
	<i>Jean-Claude Roujeau, MD</i>	
<b>39</b>	Epidermal Necrolysis (Stevens-Johnson Syndrome and Toxic Epidermal Necrolysis) . . . . .	349
	<i>L. Valeyrie-Allanore, MD, and Jean-Claude Roujeau, MD</i>	
<b>40</b>	Cutaneous Reactions to Drugs . . . . .	355
	<i>Neil H. Shear, MD, Sandra R. Knowles, BScPhm, and Lori Shapiro, MD</i>	
<b>41</b>	Pityriasis Rosea . . . . .	362
	<i>Andrew Blauvelt, MD</i>	
<b>42</b>	Erythema Annulare Centrifugum and Other Figurate Erythemas . . . . .	366
	<i>Walter H. C. Burgdorf, MD</i>	
<b>43</b>	Granuloma Annulare . . . . .	369
	<i>Julie S. Prendiville, MD, MRCPI, FRCPC</i>	

**SECTION 7. Disorders of Epidermal  
Differentiation and Keratinization . . . . . 375**

<b>44</b>	Epidermal Growth and Differentiation . . . . .	375
	<i>Stanley J. Miller, MD, Tung-Tien Sun, MD, and Pierre A. Coulombe, PhD</i>	
<b>45</b>	Skin as an Organ of Protection . . . . .	383
	<i>Ehrhardt Proksch, MD, PhD, and Jens-Michael Jensen, MD</i>	
<b>46</b>	Irritant Contact Dermatitis . . . . .	395
	<i>Antoine Amado, MD, James S. Taylor, MD, and Apra Sood, MD</i>	
<b>47</b>	The Ichthyoses . . . . .	401
	<i>Philip Fleckman, MD, and John J. DiGiovanna, MD</i>	
<b>48</b>	Inherited Keratodermas of Palms and Soles . . . . .	424
	<i>David P. Kelsell, MD, and Irene M. Leigh, MD</i>	
<b>49</b>	Acantholytic Disorders of the Skin: Darier-White Disease, Acrokeratosis Verruciformis, Grover Disease, and Hailey-Hailey Disease . . . . .	432
	<i>Alain Hovnanian, MD, PhD</i>	
<b>50</b>	Porokeratosis . . . . .	442
	<i>Grainne M. O'Regan, MRCPI, and Alan D. Irvine, MD, FRCPI, MRCP</i>	

**SECTION 8. Disorders of Epidermal and Dermal-Epidermal Cohesion and Vesicular and Bullous Disorders** . . . . . 447

- 51** Epidermal and Epidermal-Dermal Cohesion . . . . . 447  
*Leena Bruckner-Tuderman, MD, and John R. Stanley, MD*
- 52** Pemphigus . . . . . 459  
*John R. Stanley, MD*
- 53** Paraneoplastic Pemphigus . . . . . 468  
*Grant J. Anhalt, MD, and Carlos H. Nousari, MD*
- 54** Bullous Pemphigoid . . . . . 475  
*John R. Stanley, MD*
- 55** Cicatricial Pemphigoid . . . . . 481  
*Kim B. Yancey, MD*
- 56** Linear Immunoglobulin A Dermatitis and Chronic Bullous Disease of Childhood . . . . . 485  
*Caroline L. Rao, MD, and Russell P. Hall III, MD*
- 57** Pemphigoid Gestationis (Herpes Gestationis) . . . . . 490  
*Jeff K. Shornick, MD, MHA*
- 58** Epidermolysis Bullosa Acquisita . . . . . 494  
*David T. Woodley, MD, and Mei Chen, PhD*
- 59** Dermatitis Herpetiformis . . . . . 500  
*Russell P. Hall III, MD, and Stephen I. Katz, MD, PhD*
- 60** Inherited Epidermolysis Bullosa . . . . . 505  
*M. Peter Marinkovich, MD, and Eugene A. Bauer, MD*

**SECTION 9. Disorders of the Dermal Connective Tissue** . . . . . 517

- 61** Collagen, Elastic Fibers, and Extracellular Matrix of the Dermis . . . . . 517  
*Jouni Uitto, MD, PhD, Mon-Li Chu, PhD, Richard Gallo, MD, PhD, and Arthur Z. Eisen, MD*
- 62** Morphea . . . . . 543  
*Vincent Falanga, MD, FACP, and Christina E. Killoran, MD*
- 63** Lichen Sclerosus . . . . . 546  
*Ulrich R. Hengge, MD*
- 64** Dermal Hypertrophies . . . . . 550  
*Mandy Harting, MD, M. John Hicks, MD, DDS, PhD, and Moise L. Levy, MD*
- 65** Anetoderma and Other Atrophic Disorders of the Skin . . . . . 557  
*Catherine Maari, MD, and Julie Powell, MD*
- 66** Constricting Bands (Ainhum and Pseudoainhum) . . . . . 562  
*Robert T. Brodell, MD, and Stephen E. Helms, MD*

- 67** Acquired Perforating Disorders . . . . . 564  
*Mark Lebwohl, MD*

**SECTION 10. Disorders of Subcutaneous Tissue** . . . . . 569

- 68** Panniculitis . . . . . 569  
*Luis Requena, MD, Evaristo Sánchez Yus, MD, and Heinz Kutzner, MD*
- 69** Lipodystrophy . . . . . 585  
*Meredith P. Sheedy, MD, and Sarah A. Myers, MD*

**SECTION 11. Disorders of Melanocytes** . . . . . 591

- 70** Biology of Melanocytes . . . . . 591  
*Hee-Young Park, PhD, Marinya Pongpudpunth, MD, Jin Lee, MD, MBA, and Mina Yaar, MD*
- 71** Albinism and Other Genetic Disorders of Pigmentation . . . . . 608  
*Thomas J. Hornyak, MD, PhD*
- 72** Vitiligo . . . . . 616  
*Rebat M. Halder, MD, and Sumayah J. Taliaferro, MD*
- 73** Hypomelanoses and Hypermelanoses . . . . . 622  
*Hilde Lapeere, MD, Barbara Boone, MD, Sofie De Schepper, MD, Evelien Verhaeghe, MD, Katia Ongenae, MD, PhD, Nanja Van Geel, MD, PhD, Jo Lambert, MD, PhD, Lieve Brochez, MD, PhD, and Jean-Marie Naeyaert, MD, PhD*

**SECTION 12. Disorders of the Oral and Genital Integument** . . . . . 641

- 74** Biology and Pathology of the Oral Cavity . . . . . 641  
*Ginat Wintermeyer Mirowski, DMD, MD, and Eva Rawlings Parker, MD*
- 75** Diseases and Disorders of the Male Genitalia . . . . . 654  
*Christopher Barry Bunker, MA, MD, FRCP*
- 76** Diseases and Disorders of the Female Genitalia . . . . . 675  
*Rochelle R. Torgerson, MD, PhD, and Libby Edwards, MD*

**PART 3** . . . . . 685  
**DISORDERS OF THE SKIN APPENDAGES**

**SECTION 13. Disorders of the Sebaceous Glands** . . . . . 687

- 77** Biology of Sebaceous Glands . . . . . 687  
*Amanda M. Nelson, PhD, and Diane M. Thiboutot, MD*

**78** Acne Vulgaris and Acneiform Eruptions . . . . . 690  
*Andrea L. Zaenglein, MD, Emmy M. Graber, MD, Diane M. Thiboutot, MD, and John S. Strauss, MD*

**79** Rosacea . . . . . 703  
*Michelle T. Pelle, MD*

**80** Perioral Dermatitis . . . . . 709  
*Sarah L. Chamlin, MD, and Leslie P. Lawley, MD*

**SECTION 14. Disorders of the Eccrine and Apocrine Glands . . . . . 713**

**81** Biology of Eccrine, Apocrine, and Apoeccrine Sweat Glands . . . . . 713  
*Theodora M. Mauro, MD, and Lowell A. Goldsmith, MD*

**82** Disorders of the Eccrine Sweat Glands and Sweating . . . . . 720  
*Robert D. Fealey, MD, and Kenzo Sato, MD, PhD*

**83** Disorders of the Apocrine Sweat Glands . . . . . 731  
*Marni C. Wiseman, MD, FRCPC*

**SECTION 15. Disorders of the Hair and Nails . . . . . 739**

**84** Biology of Hair Follicles . . . . . 739  
*George Cotsarelis, MD, and Vladimir Boichkarev, MD, PhD*

**85** Keratosis Pilaris and Other Inflammatory Follicular Keratotic Syndromes . . . . . 749  
*Maureen Rogers, MD*

**86** Hair Growth Disorders . . . . . 753  
*Ralf Paus, MD, Elise A. Olsen, MD, and Andrew G. Messenger, MD*

**87** Biology of Nails and Nail Disorders . . . . . 778  
*Antonella Tosti, MD, and Bianca Maria Piraccini, MD*

**PART 4 . . . . . 795**  
**DISORDERS DUE TO THE ENVIRONMENT**

**SECTION 16: Disorders Due to Ultraviolet Radiation . . . . . 797**

**88** Fundamentals of Cutaneous Photobiology and Photoimmunology . . . . . 797  
*Irene E. Kochevar, PhD, Charles R. Taylor, MD, and Jean Krutmann, MD*

**89** Acute and Chronic Effects of Ultraviolet Radiation on the Skin . . . . . 809  
*Antony R. Young, PhD, and Susan L. Walker, PhD*

**90** Abnormal Responses to Ultraviolet Radiation: Idiopathic, Probably Immunologic, and Photo-Exacerbated . . . . . 816  
*John L. M. Hawk, MD, and James Ferguson, MD*

**91** Abnormal Responses to Ultraviolet Radiation: Photosensitivity Induced by Exogenous Agents . . . . . 828  
*Henry W. Lim, MD*

**SECTION 17. Skin Changes Due to Other Physical and Chemical Factors . . . . . 835**

**92** Thermoregulation . . . . . 835  
*Dean L. Kellogg, Jr., MD, PhD*

**93** Cold Injuries . . . . . 844  
*G erald E. Pi erard, MD, PhD, Fr ed erique Henry, MD, and Claudine Pi erard-Franchimont, MD, PhD*

**94** Thermal Injuries . . . . . 852  
*Robert L. Sheridan, MD*

**95** Radiobiology and Radiation Effects . . . . . 858  
*Frederick D. Malkinson, MD, and Renato G. Panizzon, MD*

**96** Skin Problems in Amputees and Ostomates . . . . . 862  
*Calum C. Lyon, FRCR, MB BChir, and Michael H. Beck, FRCR, MB ChB*

**97** Corns and Calluses . . . . . 871  
*Thomas M. DeLauro, DPM, and Nicole M. DeLauro, DPM*

**98** Sports Dermatology . . . . . 873  
*Dirk M. Elston, MD*

**99** Decubitus (Pressure) Ulcers . . . . . 878  
*Tania J. Phillips, MD, and Lilian M. Odo, MD*

**100** Body Art . . . . . 886  
*Anne Laumann, MB ChB, MRCP*

**PART 5 . . . . . 893**

**NEUROCUTANEOUS AND PSYCHOCUTANEOUS ASPECTS OF SKIN DISEASE**

**SECTION 18. Neurocutaneous and Psychocutaneous Skin Disease . . . . . 895**

**101** Neurobiology of the Skin . . . . . 895  
*Martin Steinhoff, MD, PhD, and Thomas A. Luger, MD*

**102** Pathophysiology and Clinical Aspects of Pruritus . . . . . 902  
*Gil Yosipovitch, MD, Aerlyn G. Dawn, MD, MBA, and Malcolm W. Greaves, MD, PhD, FRCR*

**103** Psychocutaneous Diseases . . . . . 912  
*Andrea Sandoz, MD, Thomas Koenig, MD, Daniel Kusnir, MD, and Francisco A. Tausk, MD*

**104** Cutaneous Manifestations of Drug Abuse . . . . . 921  
*Miguel R. Sanchez, MD*

**105** Skin Signs of Physical Abuse . . . . . 927  
*Howard Pride, MD*

**PART 6** 933

**SKIN CHANGES ACROSS THE SPAN OF LIFE**

**SECTION 19. From Birth to Old Age** . . . . . 935

- 106** Neonatal, Pediatric, and Adolescent Dermatology . . . . . 935  
*Mary Wu Chang, MD, and Seth J. Orlow, MD, PhD*
- 107** Skin Changes and Diseases in Pregnancy. . . . . 955  
*Julie K. Karen, MD, and Miriam Keltz Pomeranz, MD*
- 108** Aging of Skin. . . . . 963  
*Mina Yaar, MD, and Barbara A. Gilchrist, MD*

**PART 7** 975

**NEOPLASIA**

**SECTION 20. Carcinogenesis** . . . . . 977

- 109** Genome Instability, DNA Repair, and Cancer. . . . . 977  
*Kenneth H. Kraemer, MD, and Thomas M. Runger, MD*
- 110** Carcinogenesis: Chemical . . . . . 986  
*Andrzej A. Dlugosz, MD, and Stuart H. Yuspa, MD*
- 111** Oncogenes, Tumor Suppressor Genes, and Viral Carcinogenesis . . . . . 995  
*Nicole Basset-Sequin, MD, Celeste Lebbe, MD, Charlotte Proby, MD, and Alan Storey, MD*
- 112** Carcinogenesis: Ultraviolet Radiation . . . . . 999  
*Douglas E. Brash, PhD, Timothy Heffernan, PhD, and Paul Nghiem, MD, PhD*

**SECTION 21. Epidermal and Appendageal Tumors** . . . . . 1007

- 113** Epithelial Precancerous Lesions . . . . . 1007  
*Karynne O. Duncan, MD, John K. Geisse, MD, and David J. Leffell, MD*
- 114** Squamous Cell Carcinoma . . . . . 1028  
*Douglas Grossman, MD, PhD, and David J. Leffell, MD*
- 115** Basal Cell Carcinoma . . . . . 1036  
*John A. Carucci, MD, and David J. Leffell, MD*
- 116** Basal Cell Nevus Syndrome . . . . . 1042  
*Anthony E. Oro, MD, PhD*
- 117** Keratoacanthoma . . . . . 1049  
*Lorenzo Cerroni, MD, and Helmut Kerl, MD*
- 118** Benign Epithelial Tumors, Hamartomas, and Hyperplasias . . . . . 1054  
*Valencia D. Thomas, MD, Neil A. Swanson, MD, and Ken K. Lee, MD*

- 119** Appendage Tumors and Hamartomas of the Skin . . . . . 1068  
*R. Stan Taylor, MD, Jennifer B. Perone, MD, Steven Kaddu, MD, and Helmut Kerl, MD*

- 120** Merkel Cell Carcinoma . . . . . 1087  
*Paul Nghiem, MD, PhD, and Natalia Jaimes, MD*

- 121** Mammary and Extramammary Paget Disease . . . . . 1094  
*Isaac M. Neuhaus, MD, and Roy C. Grekin, MD*

**SECTION 22. Melanocytic Tumors** . . . . . 1099

- 122** Benign Neoplasias and Hyperplasias of Melanocytes. . . . . 1099  
*James M. Grichnik, MD, PhD, Arthur R. Rhodes, MD, MPH, and Arthur J. Sober, MD*
- 123** Atypical Melanocytic Nevi . . . . . 1122  
*Margaret A. Tucker, MD*
- 124** Cutaneous Melanoma . . . . . 1134  
*Sandra C. Paek, MD, Arthur J. Sober, MD, Hensin Tsao, MD, PhD, Martin C. Mihm, Jr., MD, and Timothy M. Johnson, MD*

**SECTION 23. Tumors and Hyperplasias of the Dermis and Subcutaneous Fat** . . . . . 1159

- 125** Malignant Fibrous Tumors of the Dermis . . . . . 1159  
*Jennifer Z. Cooper, MD, and Marc D. Brown, MD*
- 126** Vascular Tumors . . . . . 1164  
*Tara Miller, MD, and Ilona J. Frieden, MD*
- 127** Neoplasias and Hyperplasias of Muscular and Neural Origin . . . . . 1172  
*Lucile E. White, MD, Ross M. Levy, MD, and Murad Alam, MD*
- 128** Kaposi Sarcoma . . . . . 1183  
*Erwin Tschachler, MD*
- 129** Neoplasms of Subcutaneous Fat . . . . . 1190  
*Thomas Brenn, MD, PhD*

**Volume Two**

**PART 8** 1199

**THE SKIN IN SYSTEMIC DISEASE**

**SECTION 24. Skin in Nutritional, Metabolic, and Heritable Disease** . . . . . 1201

- 130** Cutaneous Changes in Nutritional Disease. . . . . 1201  
*Melinda Jen, MD, Kara N. Shah, MD, PhD, FAAP, and Albert C. Yan, MD*



<b>131</b>	Cutaneous Changes in Errors of Amino Acid Metabolism . . . . .	1219	<i>Peter H. Itin, MD, and Lowell A. Goldsmith, MD</i>
<b>132</b>	The Porphyrias . . . . .	1228	<i>David R. Bickers, MD, and Jorge Frank, MD</i>
<b>133</b>	Amyloidosis and the Skin. . . . .	1257	<i>Helen J. Lachmann, MD, and Philip N. Hawkins, MD</i>
<b>134</b>	Systemic Autoinflammatory Diseases . . . . .	1265	<i>John G. Ryan, MB, MRCP, and Daniel L. Kastner, MD</i>
<b>135</b>	Xanthomatoses and Lipoprotein Disorders . . . . .	1272	<i>Lucile E. White, MD</i>
<b>136</b>	Fabry Disease . . . . .	1281	<i>Margarita M. Larralde, MD, and Paula C. Luna, MD</i>
<b>137</b>	Lipoid Proteinosis . . . . .	1288	<i>Jonathan A. Dyer, MD</i>
<b>138</b>	Cutaneous Mineralization and Ossification . . . . .	1293	<i>John S. Walsh, MD, and Janet A. Fairley, MD</i>
<b>139</b>	Heritable Disorders of Connective Tissue with Skin Changes . . . . .	1297	<i>Mario E. Lacouture, MD, and Amy S. Paller, MD</i>
<b>140</b>	Hereditary Disorders of Genome Instability and DNA Repair . . . . .	1311	<i>Thomas M. Rünger, MD, John J. DiGiovanna, MD, and Kenneth H. Kraemer, MD</i>
<b>141</b>	Tuberous Sclerosis Complex . . . . .	1325	<i>Thomas N. Darling, MD, PhD</i>
<b>142</b>	The Neurofibromatoses . . . . .	1331	<i>Robert Listernick, MD, and Joel Charrow, MD</i>
<b>143</b>	Ectodermal Dysplasias . . . . .	1339	<i>Virginia P. Sybert, MD</i>
<b>144</b>	Genetic Immunodeficiency Diseases . . . . .	1348	<i>Amy S. Paller, MD, and Melissa Abrams, MD</i>
<b>SECTION 25. Skin Manifestations of Bone Marrow and Blood Disorders . . . . .</b>			
<b>145</b>	Hematologic Diseases . . . . .	1373	<i>Bina A. Rashid, MD, Elizabeth Bahar Houshmand, MD, and Michael P. Heffernan, MD</i>
<b>146</b>	Cutaneous Lymphoma . . . . .	1386	<i>Chalid Assaf, MD, and Wolfram Sterry, MD</i>
<b>147</b>	Inflammatory Diseases That Simulate Lymphomas: Cutaneous Pseudolymphomas. . . . .	1402	<i>Gary S. Wood, MD</i>
<b>148</b>	Langerhans Cell Histiocytosis . . . . .	1414	<i>Ruggero Caputo, MD, and Carlo Gelmetti, MD</i>
<b>149</b>	Non-Langerhans Cell Histiocytosis. . . . .	1424	<i>Carlo Gelmetti, MD, and Ruggero Caputo, MD</i>
<b>150</b>	Biology of Mast Cells and the Mastocytosis Syndromes. . . . .	1434	<i>Melody C. Carter, MD, and Dean D. Metcalfe, MD</i>
<b>SECTION 26. Skin Manifestations of Internal Organ Disorders . . . . .</b>			
<b>151</b>	The Skin and Disorders of the Alimentary Tract, the Hepatobiliary System, Kidney, and Cardiopulmonary System . . . . .	1445	<i>Graham A. Johnston, MB ChB, FRCP, and Robin A. C. Graham-Brown, MD</i>
<b>152</b>	Diabetes Mellitus and Other Endocrine Diseases . . . . .	1461	<i>Andrea A. Kalus, MD, Andy J. Chien, MD, PhD, and John E. Olerud, MD</i>
<b>153</b>	Sarcoidosis . . . . .	1484	<i>Richard M. Marchell, MD, Bruce Thiers, MD, and Marc A. Judson, MD</i>
<b>154</b>	Cutaneous Manifestations of Internal Malignant Disease: Cutaneous Paraneoplastic Syndromes. . . . .	1493	<i>Christine A. DeWitt, MD, Lucinda S. Buescher, MD, and Stephen P. Stone, MD</i>
<b>SECTION 27. The Skin in Vascular and Connective Tissue and Other Autoimmune Disorders . . . . .</b>			
<b>155</b>	Mechanisms of Autoimmune Disease. . . . .	1509	<i>Insoo Kang, MD, and Joe Craft, MD</i>
<b>156</b>	Lupus Erythematosus . . . . .	1515	<i>Melissa I. Costner, MD, and Richard D. Sontheimer, MD</i>
<b>157</b>	Dermatomyositis . . . . .	1536	<i>Richard D. Sontheimer, MD, and Melissa I. Costner, MD</i>
<b>158</b>	Scleroderma (Systemic Sclerosis). . . . .	1553	<i>Christopher P. Denton, MD, and Carol M. Black, MD</i>
<b>159</b>	Scleredema and Scleromyxedema . . . . .	1562	<i>Roger H. Weenig, MD, MPH, and Mark R. Pittelkow, MD</i>
<b>160</b>	Relapsing Polychondritis . . . . .	1567	<i>Camille Frances, MD</i>
<b>161</b>	Rheumatoid Arthritis, Rheumatic Fever, and Gout . . . . .	1569	<i>Christina L. Haverstock, MD, MS, and Joseph L. Jorizzo, MD</i>

<b>162</b> Sjögren Syndrome . . . . .	1577
<i>Stamatina Danielides, MD, and Gabor Illei, MD</i>	

**SECTION 28. The Skin  
in Inflammatory and  
Other Vascular Disorders . . . . .**

<b>163</b> Endothelium in Inflammation and Angiogenesis . . . . .	1585
<i>Peter Petzelbauer, MD, Lisan S. Peng, MD, and Jordan S. Pober, MD</i>	
<b>164</b> Cutaneous Necrotizing Venulitis . . . . .	1599
<i>Nicholas A. Soter, MD, and Jose L. Diaz-Perez, MD</i>	
<b>165</b> Systemic Necrotizing Vasculitis . . . . .	1606
<i>Carmen E. Gota, MD, and Brian F. Mandell, MD, PhD, FACR</i>	
<b>166</b> Erythema Elevatum Diutinum . . . . .	1616
<i>Nneka I. Comfere, MD, and Lawrence E. Gibson, MD</i>	
<b>167</b> Adamantiades-Behçet Disease . . . . .	1620
<i>Christos C. Zouboulis, MD, PhD</i>	
<b>168</b> Kawasaki Syndrome . . . . .	1626
<i>Donald Y. M. Leung, MD, PhD, H. Cody Meissner, MD, and Anne W. Lucky, MD</i>	
<b>169</b> Pigmented Purpuric Dermatoses . . . . .	1633
<i>Theresa Schroeder-Devere, MD</i>	
<b>170</b> Cryoglobulinemia and Cryofibrinogenemia . . . . .	1637
<i>Milan J. Anadkat, MD, Lynn A. Cornelius, MD, and Thomas J. Lawley, MD</i>	
<b>171</b> Raynaud Phenomenon . . . . .	1643
<i>John H. Klippel, MD</i>	
<b>172</b> Malignant Atrophic Papulosis (Degos Disease) . . . . .	1648
<i>Dan Lipsker, MD, PhD, and Jean-Hilaire Saurat, MD</i>	
<b>173</b> Vascular Malformations . . . . .	1651
<i>Laurence M. Boon, MD, PhD, and Miikka Viekula, MD, PhD</i>	
<b>174</b> Cutaneous Changes in Peripheral Vascular Arterial Disease . . . . .	1667
<i>Mandeep Dhady, MD, FACC, Steven M. Dean, DO, FACP, and Robert T. Eberhardt, MD</i>	
<b>175</b> Cutaneous Changes in Venous and Lymphatic Insufficiency . . . . .	1679
<i>Claude S. Burton, MD, Craig N. Burkhardt, MD, and Lowell A. Goldsmith, MD</i>	

**DISEASE DUE TO MICROBIAL AGENTS,  
INFESTATIONS, BITES, AND STINGS**

**SECTION 29: Bacterial Disease . . . . .**

<b>176</b> General Considerations of Bacterial Diseases . . . . .	1689
<i>Timothy G. Berger, MD</i>	
<b>177</b> Superficial Cutaneous Infections and Pyodermas . . . . .	1694
<i>Noah Crafti, MD, PhD, Peter K. Lee, MD, PhD, Matthew T. Zipoli, MD, Arnold N. Weinberg, MD, Morton N. Swartz, MD, and Richard Allen Johnson, MD</i>	
<b>178</b> Gram-Positive Infections Associated with Toxin Production . . . . .	1710
<i>Jeffrey B. Travers, MD, PhD, and Nico Mousdicas, MD</i>	
<b>179</b> Soft-Tissue Infections: Erysipelas, Cellulitis, Gangrenous Cellulitis, and Myonecrosis . . . . .	1720
<i>Arturo Saavedra, MD, PhD, Arnold N. Weinberg, MD, Morton N. Swartz, MD, and Richard Allen Johnson, MD</i>	
<b>180</b> Gram-Negative Coccal and Bacillary Infections . . . . .	1731
<i>Morton N. Swartz, MD</i>	
<b>181</b> The Skin in Infective Endocarditis, Sepsis, Septic Shock, and Disseminated Intravascular Coagulation . . . . .	1744
<i>Laura Korb Ferris, MD, PhD, and Joseph C. English III, MD</i>	
<b>182</b> Bartonellosis . . . . .	1749
<i>Timothy G. Berger, MD, and Francisco G. Bravo, MD</i>	
<b>183</b> Miscellaneous Bacterial Infections with Cutaneous Manifestations . . . . .	1755
<i>Scott A. Norton, MD, MPH</i>	
<b>184</b> Tuberculosis and Infections with Atypical Mycobacteria . . . . .	1768
<i>Gerhard Tappeiner, MD</i>	
<b>185</b> Actinomycosis, Nocardiosis, and Actinomycetoma . . . . .	1778
<i>Francisco G. Bravo, MD, Roberto Arenas, MD, and Daniel Asz Sigall, MD</i>	
<b>186</b> Leprosy . . . . .	1786
<i>Thomas H. Rea, MD, and Robert L. Modlin, MD</i>	
<b>187</b> Lyme Borreliosis . . . . .	1797
<i>Meera Mahalingam, MD, PhD, FRCPath, Jag Bhawan, MD, Anne-Marie Chomat, MD, and Linden Hu, MD</i>	



<b>SECTION 30. Fungal Diseases</b> . . . . .	1807	<b>201</b> Endemic (Non-Venereal) Treponematoses . . . . .	1977
<b>188</b> Superficial Fungal Infection: Dermatophytosis, Onychomycosis, Tinea Nigra, Piedra . . . . .	1807	<i>Miguel R. Sanchez, MD</i>	
<i>Shannon Verma, MD, and Michael P. Heffernan, MD</i>		<b>202</b> Chancroid . . . . .	1983
<b>189</b> Yeast Infections: Candidiasis and Tinea (Pityriasis) Versicolor . . . . .	1822	<i>Stephan Lautenschlager, MD</i>	
<i>Matthew P. Janik, MD, and Michael P. Heffernan, MD</i>		<b>203</b> Lymphogranuloma Venereum . . . . .	1987
<b>190</b> Deep Fungal Infections . . . . .	1831	<i>Samer H. Ghosn, MD, and Amal K. Kurban, MD</i>	
<i>Roderick J. Hay, MD</i>		<b>204</b> Granuloma Inguinale . . . . .	1990
<b>SECTION 31. Viral and Rickettsial Diseases</b> . . . . .	1845	<i>Abdul-Ghani Kibbi, MD, FACP, and Myrna El-Shareef, MD</i>	
<b>191</b> Viral Diseases: General Considerations . . . . .	1845	<b>205</b> Gonorrhea and Other Venereal Diseases . . . . .	1993
<i>Ammar M. Ahmed, MD, Vandana K. Madkan, MD, Natalie Mendoza, MD, Stephen K. Tying, MD, PhD, MBA and Douglas R. Lowy, MD</i>		<i>Annabelle L. Garcia, BS, Vandana K. Madkan, MD, and Stephen K. Tying, MD, PhD, MBA</i>	
<b>192</b> Exanthematous Viral Diseases . . . . .	1851	<b>SECTION 33. Infestations, Bites, and Stings</b> . . . . .	2001
<i>Leah Belazarian, MD, Mayra E. Lorenzo, MD, Nicole C. Pace, MD, Susan M. Sweeney, MD, and Karen M. Wiss, MD</i>		<b>206</b> Leishmaniasis and Other Protozoan Infections . . . . .	2001
<b>193</b> Herpes Simplex . . . . .	1873	<i>Samer H. Ghosn, MD, and Amal K. Kurban, MD</i>	
<i>Adriana R. Marques, MD, and Stephen E. Straus, MD</i>		<b>207</b> Helminthic Infections . . . . .	2011
<b>194</b> Varicella and Herpes Zoster . . . . .	1885	<i>Mary Elizabeth Wilson, MD, and Eric Caumes, MD</i>	
<i>Stephen E. Straus, MD, Michael N. Oxman, MD, and Kenneth E. Schmader, MD</i>		<b>208</b> Scabies, Other Mites, and Pediculosis . . . . .	2029
<b>195</b> Poxvirus Infections . . . . .	1899	<i>Stephen P. Stone, MD, Jonathan N. Goldfarb, MD, and Rocky E. Bacelieri, MD</i>	
<i>Wynniss Tom, MD, and Sheila Fallon Friedlander, MD</i>		<b>209</b> Bites and Stings of Terrestrial and Aquatic Life . . . . .	2037
<b>196</b> Warts . . . . .	1914	<i>Jennifer S. Daly, MD, and Mark Jordan Scharf, MD</i>	
<i>Elliot J. Androphy, MD, and Douglas R. Lowy, MD</i>		<b>210</b> Arthropod Bites and Stings . . . . .	2054
<b>197</b> Human Retroviral Disease: Human T-Lymphotropic Viruses . . . . .	1923	<i>Christopher J. Steen, MD, and Robert A. Schwartz, MD, MPH</i>	
<i>Erwin Tschachler, MD</i>		<b>■ PART 10</b> . . . . .	2065
<b>198</b> Cutaneous Manifestations of Human Immunodeficiency Virus Disease . . . . .	1927	<b>OCCUPATIONAL SKIN DISEASES AND SKIN DISEASES DUE TO BIOLOGIC WARFARE</b>	
<i>Arturo Saavedra, MD, PhD, and Richard Allen Johnson, MD</i>		<b>SECTION 34. Occupational Skin Diseases</b> . . . . .	2067
<b>199</b> The Rickettsioses, Ehrlichioses, and Anaplasmoses . . . . .	1940	<b>211</b> Occupational Skin Diseases Due to Irritants and Allergens . . . . .	2067
<i>Analisa V. Halpern, MD, Justin J. Green, MD, and Warren R. Heymann, MD</i>		<i>James S. Taylor, MD, Apra Sood, MD, and Antoine Amado, MD</i>	
<b>SECTION 32. Sexually Transmitted Diseases</b> . . . . .	1955	<b>212</b> Occupational Noneczematous Skin Diseases Due to Biologic, Physical, and Chemical Agents . . . . .	2074
<b>200</b> Syphilis . . . . .	1955	<i>Apra Sood, MD, and James S. Taylor, MD</i>	
<i>Miguel R. Sanchez, MD</i>		<b>SECTION 35. The Skin in Bioterrorism and Biologic Warfare</b> . . . . .	2081
		<b>213</b> Cutaneous Manifestations of Biologic, Chemical, and Radiologic Terrorism Attacks . . . . .	2081
		<i>Scott A. Norton, MD, MPH</i>	

**SECTION 36. Topical Therapy . . . . . 2091**

- 214** Principles of Topical Therapy . . . . . 2091  
*Kendra G. Bergstrom, MD, and Bruce E. Strober, MD*
- 215** Pharmacokinetics and Topical Applications of Drugs . . . . . 2097  
*Hans Schaefer, MD, Thomas E. Redelmeier, MD, Gerhard J. Nohynek, MD, and Jürgen Lademann, MD*
- 216** Topical Corticosteroids . . . . . 2102  
*Isabel C. Valencia, MD, and Francisco A. Kerdel, MD*
- 217** Topical Retinoids . . . . . 2106  
*Sewon Kang, MD, and John J. Voorhees, MD*
- 218** Topical Antibiotics . . . . . 2113  
*Mark W. Bonner, MD, Paul M. Benson, MD, and William D. James, MD, PhD*
- 219** Topical Antifungal Agents . . . . . 2116  
*Whitney A. High, MD, and James E. Fitzpatrick, MD*
- 220** Topical and Intralesional Cytotoxic Agents . . . . . 2122  
*Megan M. Moore, MD, and Bruce E. Strober, MD*
- 221** Topical Immunomodulators . . . . . 2125  
*Robert Sidbury, MD, and Jon M. Hanifin, MD*
- 222** Other Topical Medications . . . . . 2130  
*Craig N. Burkhart, MD, and Kenneth A. Katz, MD*
- 223** Photoprotection and Sun Protective Agents . . . . . 2137  
*Henry W. Lim, MD*
- 224** Special Considerations for Topical Therapy of Ethnic Skin . . . . . 2142  
*Roopal V. Kundu, MD*

**SECTION 37. Systemic Therapy . . . . . 2147**

- 225** Systemic Glucocorticoids . . . . . 2147  
*Victoria P. Werth, MD*
- 226** Dapsone . . . . . 2154  
*Joni G. Sago, MD, and Russell P. Hall III, MD*
- 227** Aminoquinolines . . . . . 2157  
*Jeffrey R. LaDuca, MD, PhD, and Anthony A. Gaspari, MD*
- 228** Cytotoxic and Antimetabolic Agents . . . . . 2163  
*Whitney A. High, MD, and James E. Fitzpatrick, MD*

- 229** Retinoids . . . . . 2181  
*Anders Vahlquist, MD, PhD, Stéphane Kuenzli, MD, and Jean-Hilaire Saurat, MD*

- 230** Antihistamines . . . . . 2186  
*Susan L. Limb, MD, and Robert A. Wood, MD*

- 231** Antibiotics . . . . . 2194  
*Christopher C. Gasbarre, DO, Steven K. Schmitt, MD, and Kenneth J. Tomecki, MD*

- 232** Antiviral Drugs . . . . . 2203  
*Christine M. Hay, MD, and Richard C. Reichman, MD*

- 233** Oral Antifungal Agents . . . . . 2211  
*Margaret S. Lee-Bellantoni, MD, PhD, and Nellie Konnikov, MD*

- 234** Immunosuppressive and Immunomodulatory Drugs . . . . . 2217  
*Carlos H. Nousari, MD, and Grant J. Anhalt, MD*

- 235** Immunobiologicals, Cytokines, and Growth Factors in Dermatology . . . . . 2223  
*Stephen Richardson, MD, and Joel Gelfand, MD*

- 236** Anti-Angiogenic Agents . . . . . 2231  
*Kalpna Reddy, BS, and Jack Arbiser, MD*

- 237** Drug Interactions . . . . . 2236  
*Stephen E. Wolverson, MD*

**SECTION 38. Physical Treatments . . . . . 2243**

- 238** Therapeutic Photomedicine: Phototherapy . . . . . 2243  
*Jean Krutmann, MD, and Akimichi Morita, MD, PhD*

- 239** Photochemotherapy and Photodynamic Therapy . . . . . 2249  
*Herbert Hönigsman, MD, Rolf-Markus Szeimies, MD, and Robert Knobler, MD*

- 240** Lasers and Flashlamps in Dermatology . . . . . 2263  
*Fernanda H. Sakamoto, MD, Tomi Wall, MD, Mathew M. Avram, MD, and R. Rox Anderson, MD*

- 241** Radiotherapy . . . . . 2279  
*Renato Panizzon, MD*

**SECTION 39. Complementary and Alternative Dermatology . . . . . 2285**

- 242** Complementary and Alternative Medicine in Dermatology . . . . . 2285  
*Alan Dattner, MD*

<b>SECTION 40. Surgery in Dermatology</b> . . . . .	2289
<b>243</b> Dermatologic Surgery: Introduction to Anatomy and Approach . . . . .	2289
<i>Sumaira Z. Aasi, MD, and Brent Pennington, MD</i>	
<b>244</b> Excisional Surgery and Repair, Including Flaps and Grafts . . . . .	2302
<i>June K. Robinson, MD</i>	
<b>245</b> Mohs Micrographic Surgery . . . . .	2315
<i>Ken K. Lee, MD, Valencia D. Thomas, MD, and Neil A. Swanson, MD</i>	
<b>246</b> Nail Surgery . . . . .	2320
<i>Robert Baran, MD</i>	
<b>247</b> Cryosurgery and Electrosurgery . . . . .	2330
<i>Justin J. Vujevich, MD, and Leonard H. Goldberg, MD</i>	
<b>248</b> Surgical Complications . . . . .	2336
<i>Richard Bennett, MD</i>	
<b>249</b> Wound Repair: Mechanisms and Practical Considerations . . . . .	2342
<i>Vincent Falanga, MD, FACP, and Satori Iwamoto, MD, PhD</i>	
<b>250</b> Treatment for Varicose and Telangiectatic Leg Veins . . . . .	2349
<i>Robert A. Weiss, MD, and Margaret A. Weiss, MD</i>	

<b>SECTION 41. Cosmetic Dermatology</b> . . . . .	2357
<b>251</b> Cosmetics and Skin Care in Dermatology . . . . .	2357
<i>Leslie Baumann, MD</i>	
<b>252</b> Skin Resurfacing: Ablative Lasers, Chemical Peels, and Dermabrasion . . . . .	2364
<i>Elizabeth L. Tanzi, MD, and Tina S. Alster, MD</i>	
<b>253</b> Cosmetic Applications of Non-Ablative Lasers and Other Light Devices . . . . .	2372
<i>Anne M. Chapas, MD, and Roy G. Geronemus, MD</i>	
<b>254</b> Liposuction . . . . .	2378
<i>Aimee L. Leonard, MD, and C. William Hanke, MD, MPH, FACP</i>	
<b>255</b> Soft-Tissue Augmentation . . . . .	2380
<i>Lisa M. Donofrio, MD</i>	
<b>256</b> Botulinum Toxin . . . . .	2388
<i>Richard G. Glogau, MD</i>	
<b>257</b> Hair Transplantation and Alopecia Reduction . . . . .	2394
<i>Walter P. Unger, MD, FRCP(C), FACP, Robin H. Unger, MD, and Mark Unger, MD</i>	
Index . . . . .	I-1