Dermatological Phototherapy and Photodiagnostic Methods
During the past 30 years, phototherapy has greatly influenced treatment concepts in dermatology. Consequently, photomedicine has developed from empiricism into one of the most exciting fields in biomedical research. Studies on the effects of visible and ultraviolet radiation on skin have led to a fruitful collaboration between basic scientists and clinicians. Thus, phototherapy may be regarded as a prime example of applied skin biology.

UV radiation has been used for decades in the management of common skin diseases such as psoriasis and atopic dermatitis. More recently, the introduction of selective spectra in the UVB and UVA range, such as narrowband UVB and UVA-1 phototherapy, as well as the inclusion of new indications, has much stimulated the interest in photodermatology. Visible light in combination with photosensitizers is currently in use for diagnosis and treatment of selected tumours. Extracorporeal photochemotherapy has proven to be effective beyond dermatology, in particular in transplantation medicine.

Most phototherapeutic regimes have been developed empirically and without knowledge about the biological mechanisms involved. Recent progress in the understanding of basic photobiological principles has made phototherapy more effective and, even more importantly, safer at the same time.

The second edition of this handbook takes this dualism into account by presenting clinical information on the background of current knowledge of photobiological principles. Besides the detailed description of photo- and photochemotherapy for selected skin diseases, this volume contains standardized test protocols for photodermatoses and the diagnosis of skin tumours.

There exists a variety of phototherapeutic modalities, and clinicians can now select the therapy of choice. A specific disease can thus be treated with the regimen that fits best the particular situation of a given patient. Therefore, the major focus of this volume is on the use of different treatment modalities for a specific disease. The clinically oriented chapters are supplemented by practical guidelines for phototherapy that have proven successful over many years.

Again, the leading experts have contributed to this project. Most of the authors are not only experienced clinical photodermatologists but also internationally renowned experts in basic photobiological research.

We are very grateful to all authors for their excellent contributions to this second edition. We hope that this monograph will continue to serve as the state-of-the-art reference for dermatological phototherapy and photodiagnostic methods in daily practice, clinical settings, and research.

J. Krutmann, H. Hönigsmann, C.A. Elmets
Düsseldorf, Germany; Vienna, Austria; Birmingham, Alabama, USA
Autumn 2008
One form of what was called heliotherapy 2000 years ago consisted of ingestion of an infusion (boiled extract) derived from a weed growing in the Nile Delta, *Ammi majus* L., followed by exposure to the Egyptian sun for the treatment of vitiligo, a disorder that was a serious disfigurement in this population with brown and black skin colored population. This crude treatment was the very earliest form of what is now called PUVA phototherapy, a treatment for psoriasis, vitiligo, and 34 other diseases and that uses the same chemical, psoralen, derived from the same plant source, *Ammi majus* L., and followed by exposure to specially designed computerized UV A irradiators.

Phototherapy in the practice of dermatology was, in fact, not an efficacious and practical therapeutic option until as late as the mid-1970s, when lighting engineers, photophysicists, and dermatologists worked together to develop ultraviolet (UV) irradiators emitting high-intensity UVA. The UVA irradiators were designed to deliver uniform irradiation from fluorescent tubes lining a vertical cylinder in which the patient stands upright. The dose-delivery was computerized, and the doses were not designated in minutes but in joules (UVA) or in millijoules (UVB). The result was what has been termed phototherapy, which is defined as the use of chemicals that are “activated” by exposure of the molecules to radiant energy. The first example of photochemotherapy was the oral ingestion of a photoactive chemical, psoralen, followed by exposure to long-wave ultraviolet, UVA. The acronym PUVA was created and the modality represented the first use of light and drug together for a beneficial effect in humans.

The introduction of PUVA was the driving force in the mid-1970s that sparked a whole new series of discoveries during the next two decades, i.e., newly created high-intensity ultraviolet sources: UVA (320 – 400 nm) Sylvania of the USA and narrowband UVB (311 – 312 nm) Philips of Holland which has now replaced broadband UVB, as the first-line therapy for psoriasis, and more recently UVA-1 (340 – 400 nm). These new effective therapies have been a boon particularly for patients with generalized psoriasis providing efficacious ambulatory treatments but avoiding the systemic problems of methotrexate and cyclosporin.

The successful use of the new ultraviolet techniques for the treatment of disease was the “flywheel” for the development of a new sub-specialty called photomedicine, which encompasses all of the applications of the diagnosis and treatment of photoinduced disorders as well as the use of the new modalities such as photodynamic therapy for therapy of skin tumors and other diseases. There is now a Photomedicine Society and specialized journals of photodermatology.

We should be aware that the modern methods of phototherapy and photochemotherapy are part of a whole new discipline requiring special equipment and special knowledge of photophysics and photochemistry, and there are at present a limited number of phototherapy centers in the world. In a manner of speaking, present-day phototherapy is compara-
ble to the use of X-radiation therapy in dermatology with special hardware, specific indications, the selection of patients, and the need for careful and precise dosimetry.

The practicing dermatologist needs to be educated to correctly use these sophisticated techniques, which have been evolved by large (over 5,000 patients using prospective randomized clinical trials in the United States and Europe), beginning in 1974. Alas, in the last two decades, although there was a new impetus for phototherapy, there has not been enough specialized training in phototherapy. Therefore, this updated practical manual is welcome. In this impressive volume, the indications and methodology of these various light sources are presented by an excellent international cadre of dermatologists experienced in the use of these various modalities.

It is fitting that one of the editors is from Vienna because the Dermatology Department of the Vienna General Hospital was the second in the world to use PUVA in 1975. This detailed and up-to-date practical monograph is a “must” for any group doing phototherapy or contemplating a phototherapy unit. It is also a handy instruction manual for training personnel (technicians and residents) in phototherapy.

Boston, USA, July 2000

Thomas B. Fitzpatrick †, M.D. Ph.D.
During the past 25 years, phototherapy has greatly influenced treatment concepts in dermatology. Consequently, photomedicine has developed from empiricism into one of the most exciting fields in biomedical research. Studies on the effects of visible and ultraviolet radiation on skin have led to a fruitful collaboration between basic scientists and clinicians. Thus, phototherapy may be regarded as a prime example of applied skin biology.

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Kitzbühel, Spring 2000

Jean Krutmann
Herbert Hönigsmann
Craig A. Elmets
Paul R. Bergstresser
## Contents

### Part I  Basic Mechanisms in Photo(chemo)therapy  

1  UV Radiation, Irradiation, and Dosimetry  
   L. Endres, R. Breit  
   Revised by W. Jordan, W. Halbritter  

### Part II  Photo(chemo)therapy in Daily Practice  

2  Mechanisms of Photo(chemo)therapy  
   J. Krutmann, A. Morita, C. A. Elmets  

3  Photo(chemo)therapy for Psoriasis  
   H. Hönigsmann, A. Tanew, W. L. Morison  

4  Photo(chemo)therapy for Atopic Dermatitis  
   J. Krutmann, A. Morita  

5  Phototherapy and Photochemotherapy  
   of the Idiopathic Photodermatoses  
   A. Tanew, J. Ferguson  

6  Photo(chemo)therapy for Cutaneous T-Cell Lymphoma  
   H. Hönigsmann, A. Tanew  

7  Phototherapeutic Options for Vitiligo  
   B. Ortel, V. Petronic-Rosic, P. Calzavara-Pinton  

8  Photo(chemo)therapy of Graft-versus-Host Disease (GvHD)  
   B. Vole-Platzer  

9  Phototherapy and Photochemotherapy:  
   Less Common Indications for Use  
   T. Schwarz, J. Hawk  

10 Phototherapy and HIV Infection  
   H. McDonald, P. D. Cruz, Jr.
Part III Special Phototherapeutic Modalities ................................. 239

11 Photodynamic Therapy in Dermatology ................................. 241
   R-M. Szeimies, S. Karrer, C. Abels, M. Landthaler, C. A. Elmets

12 Extracorporeal Photoimmunochemotherapy ............................ 281
   R. Knobler

13 Ultraviolet A-1 Phototherapy: Indications and Mode of Action ....... 295
   J. Krutmann, H. Stege, A. Morita

Part IV Photoprotection in Daily Practice ................................. 311

14 Acute and Chronic Photodamage from Phototherapy,
   Photochemotherapy, and Solar Radiation ................................. 313
   B. H. Mahmoud, I. H. Hamzavi, H. W. Lim

15 Photoprotection ............................................................ 333
   P. Wolf, A. Young

Part V Photodiagnostic Procedures in Daily Practice .................... 365

16 Photodiagnostic Modalities ............................ 367
   N. J. Neumann, P. Lehmann

17 The Photopatch Test ......................................................... 377
   E. Hölzle

18 Fluorescence Diagnosis in Dermatology ................................. 387
   C. Fritsch, K. Gardlo, T. Ruzicka

19 Practical Guidelines for Broadband UVB, Narrowband UVB, UVA-1
   Phototherapy, and PUVA Photochemotherapy—A Proposal ............. 415
   H. Höningmann, J. Krutmann

20 Technical Equipment ......................................................... 427
   R. Mang, H. Stege

Subject Index ........................................................................ 433
Contributors

Christoph Abels
Medizinisch-wissenschaftliche Abteilung
Dr. August Wolff GmbH & Co.
Arzneimittel
Sudbrackstraße 56
33611 Bielefeld
Germany
Email: christoph.abels@wolff-arzneimittel.de

Reinhard Breit
Theodor-Körner-Straße 6
82049 Pullach
Germany
Email: reinhard.breit@gmx.de

Piergiacomo Calzavara-Pinton
Chief of the Department of Dermatology
Azienda Spedali Civili di Brescia
Brescia
Italy
Email: calzavar@osp.unibs.it

Ponciano D. Cruz, Jr.
Department of Dermatology
University of Texas Southwestern
Medical Center
5323 Harry Hines Blvd.
Dallas, 75390-9069 TX
USA
Email: ponciano.cruz@utsouthwestern.edu

Craig A. Elmets
University of Alabama
Department of Dermatology
SDB 67
Birmingham, 35294-0007 AL
USA
Email: celmets@uab.edu

James Ferguson
Head of Photobiology Unit,
Department of Dermatology
Ninewells Hospital & Medical School
Dundee, DD1 9SY, Scotland
UK
Email: jj.ferguson@dundee.ac.uk

Clemens Fritsch
Bankstraße 6
40476 Düsseldorf
Germany
E-mail: info@cf-derm.de

Kerstin Gardlo
Hauptstraße 108
53474 Bad Neuenahr-Ahrweiler
Germany
Email: gardlo-jovic@derma-badneuenahr.de
Werner Halbritter
OSRAM GmbH
Central Laboratory for Light Measurements (QM CL-M)
Hellabrunner Straße 1
81543 München
Germany
Email: werner.halbritter@osram.de

Iltefat H. Hamzavi
Senior Staff Physician, Multicultural Dermatology
Department of Dermatology
Henry Ford Medical Center
New Center One
3031 West Grand Boulevard, Suite 800
Detroit, 48202 MI
USA
Email: ihamzav1@hfhs.org

John Hawk
Department of Photobiology
St. Thomas Hospital
London SE1 7EH
UK
Email: john.hawk@kcl.ac.uk

Erhard Hölzle
Städtische Kliniken
Klinik für Dermatologie und Allergologie
Dr.-Eden-Straße 10
26133 Oldenburg
Germany
Email: dermatologie@klinikum-oldenburg.de

Herbert Hönigsmann
Universitätsklinikum Wien
Dermatologische Klinik
Abt. Spezielle Dermatologie
Währinger Gürtel 18–20
1090 Wien
Austria
E-mail: herbert.hoenigsmann@meduniwien.ac.at

Werner Jordan
OSRAM GmbH
Central Laboratory for Light Measurements, (I OSR QM CL-M)
Hellabrunnerstraße 1
81543 Munich
Germany
Email: werner.jordan@osram.de

Sigrid Karrer
Department of Dermatology
University of Regensburg
Franz-Josef-Strauss-Allee 11
93053 Regensburg
Germany
Email: sigrid.karrer@klinik.uni-regensburg.de

Robert Knobler
Department of Dermatology
Division of Special and Environmental Dermatology
University of Vienna Medical School
Vienna General Hospital – AKH
Waehringer Gürtel 18–20
1090 Vienna
Austria
Email: robert.knobler@meduniwien.ac.at

Jean Krutmann
Universität Düsseldorf
Institut für Umweltmedizinische Forschung (IUF) gGmbH
Auf’m Hennekamp 50
40225 Düsseldorf
Germany
Email: krutmann@rz.uni-duesseldorf.de

Michael Landthaler
Head of Department of Dermatology
University of Regensburg
Franz-Josef-Strauss-Allee 11
93053 Regensburg
Germany
Email: michael.landthaler@klinik.uni-regensburg.de
Contributors

Percy Lehmann
Klinikum Wuppertal GmbH
Hautklinik
Arrenberger Straße 20
42117 Wuppertal
Germany
E-mail: plehmann@wuppertal.helios-kliniken.de

Henry W. Lim
Department of Dermatology
Henry Ford Medical Center
New Center One
3031 West Grand Blvd., Suite 800
Detroit, 48230 MI
USA
Email: hlim1@hfhs.org

Bassel H. Mahmoud
Post-doctoral Research Fellow
Department of Dermatology
Henry Ford Medical Center
New Center One
3031 West Grand Boulevard, Suite 800
Detroit, 48202 MI
USA
E-mail: bmahmou1@hfhs.org

Renz Mang
Gemeinschaftspraxis für Dermatologie, Venerologie, Allergologie, Proktologie
Hauptstraße 36
42349 Wuppertal
Germany
Email: mang@hautarzt-cronenberg.de

Hallie McDonald
Dept. of Dermatology
University of Texas
Southwestern Medical Center
5323 Harry Hines Blvd.
Dallas, 75390-9069 TX
USA
Email: hallie.mcdonald@utsouthwestern.edu

Warwick L. Morison
Johns Hopkins at Green Spring
10753 Falls Road, Suite 355
Lutherville, 21093 MD
USA
Email: wmorison@jhmi.edu

Akimichi Morita
Department of Geriatric and Environmental Dermatology
Nagoya City University
Graduate School of Medical Sciences
Nagoya 467-8601
Japan
Email: amorita@med.nagoya-cu.ac.jp

Norbert J. Neumann
Universitäts-Hautklinik
Moorenstraße 5
40225 Düsseldorf
Germany
Email: neumannt@uni-duesseldorf.de

Bernhard Ortel
Section of Dermatology
University of Chicago
5841 S. Maryland, MC 5067
Chicago, 60637-1470 IL
USA
Email: ortel@helix.mgh.harvard.edu

Vesna Petronic-Rosic
PDP Director, Section of Dermatology
University of Chicago
5841 S Maryland, MC-5067
Chicago, 60637-1470 IL
USA
Email: vrosic@medicine.bsd.uchicago.edu
Thomas Ruzicka
Universitäts-Hautklinik
Postfach 10 10 07
40001 Düsseldorf
Germany
Email: ruzicka@mwed.uni-duesseldorf.de

Thomas Schwarz
Head of Department of Dermatology, Venerology and Allergology
University Hospital of the Christian Albrechts University Kiel
Schittenhelmstraße 7
24105 Kiel
Germany
Email: tschwarz@dermatology.de

Helger Stege
Chefarzt der Dermatologie
Klinikum Lippe-Lemgo
Rintelner Straße 85
32657 Lemgo
Germany
Email: helger.stege@klinikum–lippe.de

Rolf-Markus Szeimies
Department of Dermatology
University of Regensburg
Franz-Josef-Strauß-Allee 11
93053 Regensburg
Germany
Email: rolf-markus.szeimies@klinik.uni-regensburg.de

Adrian Tanew
Division of Special & Environmental Dermatology
Department of Dermatology
Medical University of Vienna
1090 Vienna
Austria
Email: adrian.tanew@meduniwien.ac.at

Beatrix Volc-Platzer
Department of Dermatology
Donauspital/SMZ Ost
Langobardenstrasse 122
1220 Vienna
Austria
Email: beatrix.volc-platzer@smz.magwien.gv.at

Peter Wolf
Research Unit for Photodermatology
Department of Dermatology
Medical University Graz
Auenbruggerplatz 8
8036 Graz
Austria
Email: peter.wolf@meduni-graz.at

Antony Young
Photobiology Department
St. Johns Institute of Dermatology
Guy’s King/St. Thomas Hospital
London SE1 7EH
UK
Email: antony.r.young@kcl.ac.uk