PROCEEDINGS OF SPIE

[SPIDigitalLibrary.org/conference-proceedings-of-spie](https://spiedigitallibrary.org/conference-proceedings-of-spie)

Front Matter: Volume 8210

, "Front Matter: Volume 8210," Proc. SPIE 8210, Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXI, 821001 (21 March 2012); doi: 10.1117/12.932368

SPIE.

Event: SPIE BiOS, 2012, San Francisco, California, United States

PROGRESS IN BIOMEDICAL OPTICS AND IMAGING

Vol. 13, No. 4

Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXI

David H. Kessel
Tayyaba Hasan
Editors

21–22 January 2012
San Francisco, California, United States

Sponsored and Published by
SPIE

Volume 8210

Proceedings of SPIE, 1605-7422, v. 8210

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXI*, edited by David H. Kessel, Tayyaba Hasan, Proceedings of SPIE Vol. 8210 (SPIE, Bellingham, WA, 2012) Article CID Number.

ISSN 1605-7422

ISBN 9780819488534

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445

SPIE.org

Copyright © 2012, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 1605-7422/12/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

vii	Conference Committee
ix	Introduction

PHOTODYNAMIC THERAPY I

8210 02	PDT: loss of autophagic cytoprotection after lysosomal photodamage [8210-01] D. Kessel, M. Price, Wayne State Univ. (United States)
8210 03	Topical delivery of a preformed photosensitizer for photodynamic therapy of cutaneous lesions [8210-02] N. L. Oleinick, Case Comprehensive Cancer Ctr. (United States), Case Western Reserve Univ. (United States), and Univ. Hospitals Case Medical Ctr. (United States); M. E. Kenney, Case Comprehensive Cancer Ctr. (United States); M. Lam, T. McCormick, K. D. Cooper, E. D. Baron, Case Comprehensive Cancer Ctr. (United States), Case Western Reserve Univ. (United States), and Univ. Hospitals Case Medical Ctr. (United States)

PHOTODYNAMIC THERAPY II

8210 06	Probing tumor-stroma interactions and response to photodynamic therapy in a 3D pancreatic cancer-fibroblast co-culture model [8210-05] M. D. Glidden, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States) and Univ. of Massachusetts Boston (United States); I. Massodi, I. Rizvi, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States); J. P. Celli, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States) and Univ. of Massachusetts Boston (United States); T. Hasan, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States)
---------	---

PHOTODYNAMIC THERAPY III

8210 0A	A real-time treatment guidance system for pleural PDT [8210-09] T. C. Zhu, X. Liang, J. Sandell, J. C. Finlay, A. Dimofte, C. Rodriguez, K. Cengel, J. Friedberg, S. M. Hahn, E. Glatstein, Univ. of Pennsylvania (United States)
8210 0B	Light dose verification for pleural PDT [8210-10] J. L. Sandell, X. Liang, T. Zhu, Univ. of Pennsylvania (United States)
8210 0C	Characterization of tissue optical properties for prostate PDT using interstitial diffuse optical tomography [8210-11] X. Liang, K. K. Wang, T. C. Zhu, Univ. of Pennsylvania (United States)
8210 0D	Photoacoustic imaging of intravenously injected photosensitizer in rat burn models for efficient antibacterial photodynamic therapy [8210-12] Y. Tsunoi, Keio Univ. (Japan); S. Sato, H. Ashida, National Defense Medical College (Japan); M. Terakawa, Keio Univ. (Japan)

PHOTODYNAMIC THERAPY VI

- 8210 0N **A compact laparoscope type radiation source for the pin-point cancer treatment using a femtosecond laser** [8210-22]
N. Kawashima, Kinki Univ. (Japan); H. Muramatsu, M. Ueda, C. Yanagimoto, Laserck Inc. (Japan); M. Miyazawa, E. Kajiwara, Kinki Univ. (Japan)
- 8210 0O **Influence of the photosensitizer photobleaching in the propagation of light during photodynamic therapy** [8210-23]
I. Salas-García, F. Fanjul-Vélez, N. Ortega-Quijano, J. L. Arce-Diego, Univ. de Cantabria (Spain)

PHOTODYNAMIC THERAPY VII

- 8210 0R **Accurate dosimetry for monitoring response to photodynamic therapy** [8210-26]
M. Seetamraju, R. S. Gurjar, R. Myers, Radiation Monitoring Devices, Inc. (United States); T. Hasan, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States); D. E. Wolf, Radiation Monitoring Devices, Inc. (United States)
- 8210 0T **Singlet oxygen dosimetry modeling for photodynamic therapy** [8210-29]
X. Liang, K. K. Wang, T. C. Zhu, Univ. of Pennsylvania (United States)

POSTER SESSION

- 8210 0V **Control of burn wound sepsis in rats by methylene blue-mediated photodynamic treatment** [8210-31]
H. Hasegawa, Keio Univ. (Japan); S. Sato, S. Kawauchi, D. Saitoh, N. Shinomiya, H. Ashida, National Defense Medical College (Japan); M. Terakawa, Keio Univ. (Japan)
- 8210 0W **Thermography for early detection of cancer** [8210-32]
J. Kim, Korea Basic Science Institute (Korea, Republic of) and Korea Univ. (Korea, Republic of); H. Choi, S. Ryu, M. Kook, K. Chang, G. Kim, Korea Basic Science Institute (Korea, Republic of)
- 8210 0X **Maximizing fluence rate and field uniformity of light blanket for intraoperative PDT** [8210-34]
X. Liang, P. Kundu, J. Finlay, M. Goodwin, T. C. Zhu, Univ. of Pennsylvania (United States)
- 8210 0Z **Double-excitation fluorescence spectral imaging: eliminating tissue auto-fluorescence from *in vivo* PPIX measurements** [8210-36]
S. Torosean, B. Flynn, Thayer School of Engineering, Dartmouth College (United States); K. S. Samkoe, Dartmouth Medical School (United States); S. C. Davis, J. Gunn, J. Axelsson, Thayer School of Engineering, Dartmouth College (United States); B. W. Pogue, Thayer School of Engineering, Dartmouth College (United States) and Dartmouth Medical School (United States)
- 8210 12 **Optimization of parameters in photodynamic therapy to kill *p. aeruginosa* with 809-nm diode laser and indocyanine green** [8210-39]
N. Topaloglu, S. Yuksel, M. Gulsoy, Bogazici Univ. (Turkey)

- 8210 14 **Histologic differences between orthotopic xenograft pancreas models affect Verteporfin uptake measured by fluorescence microscopy and spectroscopy** [8210-41]
J. A. O'Hara, Thayer School of Engineering, Dartmouth College (United States); K. S. Samkoe, Thayer School of Engineering, Dartmouth College (United States) and Dartmouth Medical School (United States); A. Chen, M. Isabelle, Thayer School of Engineering, Dartmouth College (United States); P. J. Hoopes, Thayer School of Engineering, Dartmouth College (United States) and Dartmouth Medical School (United States); T. Hasan, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States); B. W. Pogue, Thayer School of Engineering, Dartmouth College (United States) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States)
- 8210 15 **Tissue photosensitizer dosimetry using spectrally-resolved fluorescence for pre-clinical and clinical verteporfin-PDT of pancreatic cancer** [8210-42]
M. Isabelle, S. Davis, Z. Li, J. Gunn, Thayer School of Engineering, Dartmouth College (United States); P. J. Hoopes, Thayer School of Engineering, Dartmouth College (United States) and Dartmouth Medical School (United States); S. Pereira, Univ. College Hospital (United Kingdom); C. A. Mosse, Univ. College London (United Kingdom); T. Hasan, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States); B. W. Pogue, Thayer School of Engineering, Dartmouth College (United States), Dartmouth Medical School (United States), and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States)

Author Index

Conference Committee

Symposium Chairs

James G. Fujimoto, Massachusetts Institute of Technology
(United States)

R. Rox Anderson, Wellman Center for Photomedicine, Massachusetts
General Hospital, Harvard School of Medicine (United States)

Program Track Chair

Brian Jet-Fei Wong, Beckman Laser Institute and Medical Clinic
(United States)

Conference Chairs

David H. Kessel, Wayne State University (United States)

Tayyaba Hasan, Massachusetts General Hospital, Harvard Medical
School (United States)

Program Committee

Charles J. Gomer, Childrens Hospital Los Angeles (United States)

Nancy L. Oleinick, Case Western Reserve University (United States)

Brian W. Pogue, Thayer School of Engineering, Dartmouth College
(United States)

Ravi Pandey, Roswell Park Cancer Institute (United States)

Kenneth K. Wang, Mayo Clinic (United States)

Session Chairs

- 1 Photodynamic Therapy I
David H. Kessel, Wayne State University (United States)
- 2 Photodynamic Therapy II
Tayyaba Hasan, Massachusetts General Hospital, Harvard Medical
School (United States) (United States)
- 3 Photodynamic Therapy III
Timothy C. Zhu, The University of Pennsylvania Health System (United
States)
- 4 Photodynamic Therapy IV
Jonathan P. Celli, Massachusetts General Hospital (United States)

- 5 Photodynamic Therapy V
Kenneth K. Wang, Mayo Clinic (United States)
- 6 Photodynamic Therapy VI
Brian W. Pogue, Thayer School of Engineering, Dartmouth College
(United States)
- 7 Photodynamic Therapy VII
Conor L. Evans, Wellman Center for Photomedicine (United States)

Introduction

SPIE has sponsored conferences relating to Photodynamic Therapy since 1987, with the current symposium representing the 21st in the series. Some of the prior meetings occurred before the current numbering system was in place. These conferences bring together a collection of people involved in everything from device design to clinical practice.

PDT was originally discovered when it was noted that microorganisms could be killed by the combination of certain dyes plus light. While the current applications relate mainly to therapy of cancer, applications for antimicrobial therapy are being developed. PDT has a major advantage over conventional approaches to cancer control. Adverse reactions are minimal and re-treatment is readily feasible. Moreover, the resulting fluorescence of localized photosensitizers can aid in the identification of neoplastic loci. The major problem is that one must know where to aim the light, so that tumors in unknown locations are unaffected.

PDT applications appear to be more prevalent in Asia and Europe for reasons more related to the pharmaceutical industry than to feasibility. Properly used, this can be a useful tool for some indications. The SPIE conferences are designed to aid in the development of new approaches and the exchange of information relating to current progress.

David H. Kessel
Tayyaba Hasan