

PROGRESS IN BIOMEDICAL OPTICS AND IMAGING

Vol. 10 , No. 4

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

David H. Kessel

Editor

24–25 January 2009

San Jose, California, United States

Sponsored and Published by

SPIE

Volume 7164

Proceedings of SPIE, 1605-7422, v. 7164

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 XVIII*, edited by David H. Kessel, Proceedings of SPIE Vol. 7164 (SPIE, Bellingham, WA, 2009) Article CID Number.

ISSN 1605-7422

ISBN 9780819474100

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 © 2009, 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 1605-7422/09/\$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 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

SESSION 1 PRECLINICAL I

7164 02	The role of reactive oxygen species in PDT efficacy (Invited Paper) [7164-01] M. Price, N. Okan-Mensah, A. M. Santiago, D. Kessel, Wayne State Univ. School of Medicine (United States)
7164 03	Autophagy in response to photodynamic therapy: cell survival vs. cell death (Invited Paper) [7164-02] N. L. Oleinick, L. Xue, S. Chiu, S. Joseph, Case Western Reserve Univ. (United States)

SESSION 2 PRECLINICAL II

7164 09	Imaging of a targeted PDT drug with fluorescence tomography [7164-08] D. Muffoletto, A. Gupta, Z. Xu, Roswell Park Cancer Institute (United States); C. Mahrer, North Dakota State Univ. (United States); G. Bauer, Univ. of Rochester (United States); S. Galas, R. K. Pandey, U. Sunar, Roswell Park Cancer Institute (United States)
7164 0A	In vivo light dosimetry for pleural PDT [7164-09] A. Dimofte, T. C. Zhu, J. C. Finlay, M. Culligan, C. E. Edmonds, J. S. Friedberg, K. Cengel, S. M. Hahn, Univ. of Pennsylvania (United States)
7164 0B	A heterogeneous algorithm for PDT dose optimization for prostate [7164-10] M. D. Altschuler, T. C. Zhu, Y. Hu, J. C. Finlay, A. Dimofte, K. Wang, J. Li, K. Cengel, S. B. Malkowicz, S. M. Hahn, Univ. of Pennsylvania (United States)

SESSION 3 PRECLINICAL III

7164 0D	Magnetic resonance image-guided photodynamic therapy of xenograft pancreas tumors with verteporfin [7164-12] K. S. Samkoe, A. Chen, Dartmouth College (United States); I. Rizvi, Dartmouth College (United States) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States); J. A. O'Hara, Dartmouth College (United States); P. J. Hoopes, Dartmouth College (United States); T. Hasan, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States); B. W. Pogue, Dartmouth College (United States)
7164 0F	Dose limited fluorescence microscopy of 5-aminolevulinic acid induced protoporphyrin IX in living cells [7164-14] H. Schneckenburger, Hochschule Aalen (Germany) and Univ. Ulm (Germany); P. Weber, M. Wagner, S. Schickinger, T. Bruns, Hochschule Aalen (Germany); W. S. L. Strauss, Univ. Ulm (Germany)

SESSION 4 CLINICAL AND PRECLINICAL I

- 7164 0J **Photodynamic therapy for pancreatic and biliary tract carcinoma** [7164-18]
S. P. Pereira, Univ. College London (United Kingdom)
- 7164 0K **Enhancement and optimization of PpIX-based photodynamic therapy of skin cancer: translational studies from bench to clinic** [7164-19]
E. V. Maytin, S. Anand, C. Baran, G. Honari, S. Lohser, A. Kyei, P. Bailin, Lerner Research Institute, Cleveland Clinic (United States); B. W. Pogue, Dartmouth Medical School (United States)

SESSION 5 CLINICAL AND PRECLINICAL II

- 7164 0M **Brain tumor resection guided by fluorescence imaging** [7164-21]
F. Leblond, K. M. Fontaine, P. Valdes, S. Ji, B. W. Pogue, Dartmouth College (United States); A. Hartov, Dartmouth College (United States) and Dartmouth Hitchcock Medical Ctr. (United States); D. W. Roberts, Dartmouth Hitchcock Medical Ctr. (United States); K. D. Paulsen, Dartmouth College (United States) and Dartmouth Hitchcock Medical Ctr. (United States)
- 7164 0N **System for fluorescence quantification of thin tissue layers guided by high frequency ultrasound** [7164-22]
J. Gruber, V. Krishnaswamy, Dartmouth College (United States); T. Hasan, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (United States) and Harvard Medical School (United States); E. V. Maytin, Cleveland Clinic (United States); B. W. Pogue, Dartmouth College (United States)
- 7164 0O **Optimization of physiological parameter for macroscopic modeling of reacted singlet oxygen concentration in an in vivo model** [7164-23]
K. K.-H. Wang, T. M. Busch, J. C. Finlay, T. C. Zhu, Univ. of Pennsylvania (United States)
- 7164 0P **Reconstruction of optical properties using a diffusion model for interstitial diffuse optical tomography** [7164-24]
K. K.-H. Wang, T. C. Zhu, Univ. of Pennsylvania (United States)
- 7164 0Q **Diffuse reflectance spectra measured *in vivo* in human tissues during Photofrin-mediated pleural photodynamic therapy: updated results** [7164-25]
J. C. Finlay, T. C. Zhu, A. Dimofte, J. S. Friedberg, K. A. Cengel, S. M. Hahn, Univ. of Pennsylvania (United States)

SESSION 6 CLINICAL AND PRECLINICAL III

- 7164 0R **Periowave demonstrates bactericidal activity against periopathogens and leads to improved clinical outcomes in the treatment of adult periodontitis** [7164-26]
C. N. Street, R. Andersen, N. G. Loebel, Ondine Biopharma Corp. (United States)
- 7164 0U **Monitoring blood flow and photobleaching during topical ALA PDT treatment** [7164-29]
T. L. Sands, U. Sunar, Roswell Park Cancer Institute (United States); T. H. Foster, Univ. of Rochester Medical Ctr. (United States); A. R. Oseroff, Roswell Park Cancer Institute (United States)

POSTER SESSION

- 7164 0W **Photophysical and photochemical properties of α -(8-quinolinoxy) zinc phthalocyanine for photodynamic therapy** [7164-31]
Y. Lv, S. Yu, H. Lin, B. Li, Fujian Normal Univ. (China); J. Xue, Fuzhou Univ. (China); S. Xie, Fujian Normal Univ. (China)
- 7164 0X **Interaction of dye-enhanced phototherapy and chemotherapy in the treatment of cancer: an *in vitro* study** [7164-32]
Y. Tang, A. J. McGoron, Florida International Univ. (United States)
- 7164 0Y **PDT driven by energy-converting materials: a theoretical analysis** [7164-33]
J. C. Finlay, Univ. of Pennsylvania (United States)
- 7164 11 **Spectroscopic, cyto-, and photo-toxicity studies of substituted piperidones: potential sensitizers for two-photon photodynamic therapy** [7164-36]
K. W. Short, T. L. Kinnibrugh, D. M. Sammeth, T. V. Timofeeva, New Mexico Highlands Univ. (United States)
- 7164 12 **The mechanism of PDT-induced electrical blockade: the dependence of time-lapse localization of talaporfin sodium on the cell death phenotypes in rat cardiac myocytes** [7164-37]
A. Ito, H. Matsuo, T. Suenari, Keio Univ. (Japan); S. Miyoshi, S. Takatsuki, S. Ogawa, Keio Univ. School of Medicine (Japan); T. Arai, Keio Univ. (Japan)

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 (United States) and Harvard School of Medicine (United States)

Program Track Chair

Reza S. Malek, Mayo Clinic (United States)

Conference Chair

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

Cochair

Tayyaba Hasan, Wellman Center for Photomedicine, Massachusetts General Hospital (United States) and Harvard School of Medicine (United States)

Program Committee

Thomas H. Foster, University of Rochester (United States)
Charles J. Gomer, Childrens Hospital Los Angeles (United States)
Nancy L. Oleinick, Case Western Reserve University (United States)
Brian W. Pogue, Dartmouth College (United States)
Kevin M. Smith, Louisiana State University (United States)
Kenneth K. Wang, Mayo Clinic (United States)

Session Chairs

- 1 Preclinical I
David H. Kessel, Wayne State University (United States)
- 2 Preclinical II
Thomas H. Foster, University of Rochester Medical Center (United States)
Nancy L. Oleinick, Case Western Reserve University (United States)

- 3 Preclinical III
 Tayyaba Hasan, Wellman Center for Photomedicine, Massachusetts
 General Hospital (United States) and Harvard Medical School
 (United States)
 Sung K. Chang, Massachusetts General Hospital (United States)
- 4 Clinical and Preclinical I
 Kenneth K. Wang, Mayo Clinic (United States)
 Merrill A. Biel, University of Minnesota (United States)
- 5 Clinical and Preclinical II
 Theresa Busch, The University of Pennsylvania Health System (United
 States)
 Timothy C. Zhu, University of Pennsylvania (United States)
- 6 Clinical and Preclinical III
 Brian W. Pogue, Dartmouth College (United States)
 Soumya Mitra, University of Rochester Medical Center (United States)

Introduction

There is a long and productive relationship between SPIE and the field of Photodynamic Therapy. Conferences relating to this emerging field were initiated by Tom Dougherty in 1977, and have continued to this day. The first such meeting sponsored by SPIE occurred in 1987, organized jointly by Doug Neckers (Bowling Green State University) and Tayyaba Hasan (Massachusetts General Hospital). In 1989, Dr. Dougherty began chairing a series of PDT sessions, as part of the SPIE BIOS program. This conference was initially held in Los Angeles, moved to San Jose in 1995, and is to be held in San Francisco beginning in 2010. Dougherty continued as Chair until 2003 when I was asked to be the conference organizer. Tayyaba Hasan has served as co-chair since 2008.

SPIE also published a collection of manuscripts from the 1994 Congress of the International Photodynamic Association (Amelia Island, FL). The IPA met in Europe, Australia and Asia thereafter, but in 2009 will return to the US (Seattle). SPIE will once again publish the papers presented at the Congress. In 1993, I edited a volume containing reprints of 89 key papers relating to the history of PDT. This was published as part of the SPIE 'Milestone' Series, titled: Selected Papers on Photodynamic Therapy.

The annual inclusion of PDT sessions at the SPIE BIOS meeting provides an opportunity for clinical research, pre-clinical studies and photophysical approaches to be discussed. This provides a useful format for bringing together physicians, engineers, laser specialists and others who can compare notes and keep track of progress in this multi-disciplinary field.

David H. Kessel

