THE SCIENCE BEHIND LLLT
From molecular biology to cell and tissue level- what are the mechanisms of action?

American Society for Photobiology ***—a topical symposium on***

The Science Behind LLLT
–from molecular biology to cell and tissue level—what are the mechanisms of action?

August 7-8, 2009 at the University of Rochester, Rochester, NY, USA

What is this about?

Over the past 40 years there have been many seemingly extraordinary claims of successful treatments of a wide rangeof diseases, dysfunctions and injuries through the use of "low-level" laser (or light) therapy (LLLT). Many different terms have been used—from LLLT to "biostimulation," "photobiomodulation," and other terms. Claims ranging from wound healing, analgesia, reduction of inflammation and nerve regeneration have been seriously questioned by the scientific community and met with great skepticism by much of the medical community. Since irradiances are below levels that produce any significant increase in tissue temperature, it is generally agreed that if these photobiological treatments are real, then they are photochemical rather than photothermal in nature. Although there are now FDA-cleared LLLT treatments and growing acceptance from some quarters, the scientific acceptance has been routinely set back by poorly designed, less-than-rigorous experimental and clinical studies. Clearly presented photobiological dosimetry and recognition of fundamental methodology in the field of photobiology have frequently been lacking. The aim of this ASP symposium is to explore the scientific evidence for the photobiological mechanisms behind LLLT—from molecular biology to cell and tissue level, and to review those clinical results that appear to be well founded. Ample time has been planned for discussion after each review of the key scientific questions from action spectra to temporal and spatial factors that appear to influence outcome.

A key element for this symposium is to encourage photochemists, photobiologists—and even plant photobiologists—and others who are not generally involved in studies of LLLT to attend and participate in discussions. We encourage past skeptics to participate and explore with us the evidence for cellular effects. The basic scientific studies that explore mechanisms of action rather than clinical studies will be emphasized, but it is important to see what is really clinically significant. There are invited reviews of the clinical studies.

Organizing Committee:
Raymond Lanzafame; Juanita Anders; Michael Hamblin; David Sliney, Margaret Wong-Riley; James Zavislan.

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FRIDAY, AUGUST 7, 2009

08:00– 08:30 Keynote *Why is there Confusion? The Opportunity* –Raymond Lanzafame, M.D.
—a clinical perspective and what are likely and unlikely as the mechanisms

Session 1 – INTRODUCTION –
Raymond Lanzafame, Chair

09:00- 09:25 *Basics of Photobiology – Why LLLT has been slow to be accepted by mainstream science and medicine, and how to change this. The importance of using the correct wavelength and dose, and how to determine this. The laws of photochemistry* Kendric Smith, Stanford University (Emeritus Professor).

09:25 –09:50 *Tissue Optics—Statistics of coherent and incoherent light in tissue—the effects of monochromaticity and the potential of laser speckle.* James Zavislan, University of Rochester, The Institute of Optics, Rochester, NY

09:50 -10:15 *Dosimetry and the natural environment*—the changing spectrum of sunlight—does this give temporal cues? What radiometric quantities are appropriate—from radiant exposures to internal tissue fluence: David Sliney, President, ASP

10:15 -10:35 Coffee Break

Session 2 - TARGET MOLECULES—the INITIATION PROCESS—*in vitro studies*
Michael Hamblin, Chair

10:35 – 11:00 *Cellular and Molecular Mechanisms of LLLT: Role of Reactive Oxygen Species and Nitric oxide* - Michael R Hamblin, Wellman Center, MGH, Harvard Medical School, Boston

11:00 – 11:25 *Photoactive porphyrins and reactive oxygen species (ROS) in mitochondria* -Robert Smith, Physiological Sciences, University of Stellenbosch, South Africa

11:25 - 11:50 *Flavins and flavoproteins* – Production of ROS by visible light: Rachel Lubart, Bar-IIan University, Israel

11:50 - 12:15 *Therapeutic role of cytochome c oxidase in neurons.* Margaret Wong-Riley, Medical College of Wisconsin, Milwaukee, WI

12:15—1:30 LUNCH

Session 3*:* CELLULAR STUDIES AND PHOTOBIOLOGY
Chair: Juanita J Anders USUHS, Bethesda, MD

01:30—01:55 *Light Interaction with Stem/Progenitor Cells* – Juanita Anders, USUHS, Bethesda, MD

01:55 - 02:25 *Parkinsons cybrids* - Patricia Trimmer, University of Virginia

02:25 – 02:50 *Inflammatory Responses*— Jan Bjordal, University of Bergen, Norway

02:50—03:10 Coffee Break

03:10 – 03:35 *Light Modulation of Central Nervous System Response to Injury* — Xingjia Wu, USUHS, Bethesda, MD

03:35—04:00 *UV Interaction with DNA and Cellular Repair.* Thomas P. Coohill, Siena College, Loudonville, NY.

04:00 – 04:25 *UV Photobiology of the skin.* Alice Pentland, Department Dermatology, University of Rochester

04:25—04:50 *Title*—Holly Gorton

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SATURDAY, AUGUST 8, 2009

Session 4 - Animal studies
Chair -- –Margaret Wong-Riley, Wisconsin

8:00- 8:30 *Acute light exposure (670 nm) activates genes in mouse skin but does not significantly alter cancer growth in long term:* Max Myakishev-Rempel , Institute of Optics, University of Rochester, Rochester, NY

8:30- 9:00 *Laser Phototherapy as Procedure for Peripheral Nerve Regeneration, Muscle Preservation, and Nerve Cell Therapy.* - Shimon Rochkind, Tel Aviv Sourasky Medical Center, Tel Aviv University, Israel

9:00- 9:30 *Collagen synthesis, our work with wound healing/tensi* – Istvan Stadler, Surgical Laser Center, Rochester, NY

9:30 – 10:00 *Veterinary studies* - Peter Jenkins, SpectraVET Inc, Roseland, VA

10:00- 10:20 Coffee Break

10:20- 10:50 *FDA Regulations of Low Level Light Laser Therapy devices*—Richard Felten, FDA

Session 5 Clinical studies
chair

10:50- 11:20 *UV-A corneal collagen* - Steve Trokel, Columbia-Presbyterian Medical Center, New York, NY

11:20 –11:50 *Observational Studies of Low-Intensity Light Therapy for Treatment of Cellulite--Comparisons with Thermal Therapy* - Michail Pankratov, Eleme' Medical, Inc., Merrimack, NH

11:50 - 12:20 *Wound healing— the role of TGFbeta and other factors* –Praveen Arany; Harvard University, Cambridge, MA

12:20 – 1:45 Lunch

1:45 – 2:15 *Stroke – Clinical Studies* —Jackson Streeter, Photo Thera, Carlsbad, CA

2:15— 2:45 *LLLT and microsurgery* - Stefano Geuna, University of Torino, Dept of Science, Italy

2:45 – 3:05 Coffee Break

3:05— 3:35 *The challenges the manufacturer faces in developing a trial for efficacy*- James Carol, Thor Laser, Stuarts Draft, VA

3:35— 4:05 Human Safety Evaluation of Light-based Devices for Home Use- J. Frank Nash, Proctor & Gamble, Cincinnati, OH

Session 6 - Panel Discussion

4:05— 5:05 *Conclusions and on the needs for further research*:
James Zavislan, Juanita Anders, Raymond Lanzafame, Michael Hamblin, Martha Ribeiro

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Goergen Hall—Room 101
University of Rochester—River Campus
August 7th & 8th, 2009

Registration Rates:
Registration—$150.00
Students and Postdocs—$50.00

Register Online at: http://www.pol-us.net/ASP_Home/asp_meet.html

Seating is limited so register early!

If you need assistance or further information, please contact Linda Hardwick at:
lhardwick@allenpress.com

Hotel Information:

Double Tree Rochester
1111 Jefferson Road
Rochester, NY
585-475-1510 or 800-222-TREE

We have secured the reduced rate of $109.00
Be sure to mention the room block name—ASP

Reservations must be made by July 6, 2009 to ensure this price. After this date, there is no guarantee of this rate.

Hotel provides complimentary shuttle from airport to hotel from 7:00am—10:45pm. Parking is free for hotel guests.