WALT 2010

8th WALT Congress - Bergen, Norway

8th International Congress of the
WORLD ASSOCIATION FOR LASER THERAPY

25th – 28th September 2010
BERGEN, NORWAY

WALT
World Association for Laser Therapy

Høgskolen i Bergen
BERGEN UNIVERSITY COLLEGE

Program and Abstracts

electron auto-oxidation ($O_2^{\bullet-}$ formation), photodynamic action ($^1O_2$ formation), and changes in biochemical activity induced by the local transient heating of the absorbing chromophores. A novel mitochondrial light-activated cellular signaling pathway between mitochondria and cell nucleus (retrograde signaling) has been discovered and investigated. Cytochrome c oxidase can work as a signal generator as well as a signal transducer in irradiated cells.

25B1515 Ribeiro — Abstract presentation

Title: **Study of the light parameters on cell cultures following low intensity red laser therapy.**
Author(s): Martha Simões Ribeiro[1], Daniel Ranzani da Costa[1], Renato Araújo Prates[1], Daiane Thaís Meneguzzo[1], Silvia Cristina Núñez[1], Marcia Martins Marques[2]. [1] Centro de Lasers e Aplicaçãoes IPEN - CNEN\SP, Brazil . [2] Departamento de Dentística- Faculdade de Odontologia\USP-SP, Brazil.
Background and objective: Low intensity laser radiation has been used in life sciences to improve cellular and tissue functions. The purpose of this study was to analyze the proliferation of prokaryotic and eukaryotic cells, using Escherichia coli and fibroblasts cells models after low intensity red laser irradiation with different parameters.
Methods: To study energy density, five groups were established using a red laser (λ= 660nm): the control group (GC) not irradiated; G(1-10)- fluence of 1J/cm^2 and power (P) 10mW; G(4-10) fluence of 4J/cm^2 and P= 10mW; G(1-40) fluence of 1J/cm^2 and P= 40mW; G(4-40) fluence of 4J/cm^2 and P= 40mW. To study exposure time, the groups were: control group (GC) where the cells was not irradiated; G(100-10)- t= 100s and P= 10mW; G(400-10)- t=400s and P=10mW; G(100-40)- t=100s and P= 40mW; G(400-40)- t=400s and P=40mW. This study was performed in three different days every time in triplicate and the results were submitted to statistical analysis; both prokaryotic and eukaryotic cells were tested in all conditions.
Results: The results suggest a highest biostimulation in groups G4-40 and G400-10 whereas G40-4 showed the lowest cell proliferation.
Conclusion: These findings indicate that the parameters fluence, fluence rate and exposure time are equally important on the regulation of the proliferate function of prokaryotic and eukaryotic cells.

25B1530 Dyson — Abstract presentation

Title: **The role of the circulation in the spatial and temporal amplification of the effects of photons on injured tissue: an analysis of current knowledge.**
Authors: Mary Dyson PhD FCSP(Hon), King's College London (KCL) UK and Salah E O Elsayed PhD FRCS, King Saud Bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia.
Abstract: Photon-induced changes in the microcirculation and macrocirculation reported recently may be involved in the therapeutic effects of low level light (including laser) therapy (LLLT). The effects of photon absorption may be amplified by changes in immune (inflammatory) cells and regulatory proteins while in transit through the dermal capillaries. Located just beneath the epidermis in the papillary layer of the dermis, their cellular and molecular contents are readily accessible to photons during LLLT, as are their endothelial cells and pericytes, all of which can be affected directly by photons.
Cytokines and other regulatory proteins are secreted by inflammatory and other cells located in the epidermis, and in the extravascular and intravascular components of the dermis, in response to injury and during tissue repair, the progress of which they control. Evidence will be provided that these proteins, secreted by cells as a direct response to photon absorption, can initiate indirect responses in cells that have not absorbed photons when they reach them via the circulating blood. This provides a mechanism whereby the effects of LLLT can be amplified spatially and temporally. In consequence, treatment duration is a clinically important parameter. Within the therapeutic range of power and duration, the longer the duration, the greater the number of circulating cells and regulatory molecules that can be affected directly by photons while in transit through the dermal capillaries, and the greater the clinical effectiveness of LLLT on the repair of injured tissues.