Method: Our work has focussed on the ability of laser irradiation to proliferate apipose derived stem cells (ADSCs), maintain ADSC character and increase the rate and maintenance of differentiation of ADSCs into smooth muscle and skin fibroblast cells. In addition wavelength and fluence have also been studied and found to contribute to biostimulation. The use and application of ADSC differentiated SMCs for clinical applications using resorbable, injectable solid Polycarbolactone (PCL) microspheres as a delivery and bulking agent for clinical applications is currently being investigated and shows great promise.

26B0915 Houreld Abstract presentation

Title: **Low Intensity Laser Irradiation at a Visible Wavelength of 636 nm Positively Effects Stressed Models *In Vitro***

Author(s): N. Houreld, P. Sekhejane and H. Abrahamse. Laser Research Centre, Faculty of Health Sciences, University of Johannesburg, P.O. Box 17011, Doornfontein, Johannesburg, South Africa.

Background and Objective: Wound healing in diabetic patients remains a complicated problem and there is a compelling need for the development of new, safe, reliable therapies. This study looked at the effect of low intensity laser irradiation (LILI) on diabetic wound healing *in vitro.*

Methods: The effect of LILI was evaluated on various cell models of human skin fibroblast cells (normal, wounded, diabetic wounded, hypoxic). Cells were irradiated at 636 nm with 5 J/cm^2. Cellular responses evaluated included: morphology, viability (Trypan blue and caspase 3/7), proliferation (XTT), cytotoxicity (LDH) and cytokine expression (IL-1β and TNF-α).

Results: Stressed cells showed increased expression of IL-1β and TNF-α, caspase 3/7 activity and cytotoxicity, and decreased proliferation compared to normal cells. Irradiation produced an increase in proliferation and viability, and a decrease in apoptosis, and pro-inflammatory cytokines (IL-1β and TNF-α).

Conclusion: The models used are sufficient to produce measurable effects as compared to normal cells. LILI positively effects wound healing in stressed models, normalises cellular function, and directs cells into cell survival pathways.

26B0915 Silva / Ribeiro Abstract presentation

Title: **Effects of near infrared laser therapy on the genic expression of mesenchimal stem cells from dental pulp. An in vitro study**

Author(s): Vinicius Marchiori Silva[1], Silvia Cristina Nunez[1], Luciane Hiramatsu Azevedo[1], Martha Simões Ribeiro[1,2]

[1]Mestrado Profissionalizante Lasers em Odontologia, IPEN-CNEN/SP, Brazil. [2]Centro de Lasers e Aplicações, IPEN-CNEN/SP, Brazil.

Background and objective: Adult stem cell therapy is a feasible treatment that opens up a wide variety of therapeutical possibilities. The stimulatory effect of the low laser radiation over cell culture has been consistently reported on literature. The aim of our study was to investigate the effects of a near infrared laser (λ= 830nm) on the genic expression of the genes linked to differentiation of mesenchymal stem cells (MSC) to osteoblastic lineage.

Methods: Pulp stem cells were obtained from third molar teeth extracted from patients due to clinical indication. They were manipulated immediately after extraction in a sterile unit and opened to access the dental pulp chamber. The pulp tissue was then digested to separate the MSC. Samples collected from the cell population freshly extracted were analyzed by flow citometry and the presence of MSC was confirmed. The cells were put into culture and divided into two groups: laser group (LG) that received laser radiation with 3J/cm2 and 80mW of power with a beam diameter of 0.028cm. The cell cultures were irradiated in ten non-consecutive days in a total period of 21 days. A control group (CG) without irradiation was used for comparison.

Results: The results showed differences between the expression of the genes linked to cellular differentiation detected by molecular analysis RT-PCR and PCR. The results demonstrated that laser radiation on the afforded mentioned parameters promotes a faster differentiation on MSC.
Conclusion: The union of laser therapy and adult stem cell therapy may be a promising tool open new possibilities mostly on tissue engineering techniques.

26B0945 Sharifi

Abstract presentation

Clinical and Histomorphological Evaluation of Low Level laser Effect with Autologous Neural Undifferentiated Mesenchymal Stem Cells into injured spinal cord of rats

Authors: Dehghan, MM[1]; Sharifi,D[1];Izadi, S[1] ; Pedram,MS[1]; arjanmehr,H[2];Nasiri,SM[1]
1.Department of Clinical Sciences, Faculty of Veterinary Medicine, Center of Excellence for Studies of Animal Stem Cells University of Tehran, Tehran, Iran; 2.Department of Veterinary Pathology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Purpose: The aim of the present study was to investigate the direct effect of Low Level Laser (LLL) in combination of autologous neural mesenchymal stem cells on re-establishment of functional capacity of regeneration of injured spinal cord. The use of stem cells for functional recovery after spinal cord injury will be potentiated with application of non-invasive physical modalities like laser, duely will be advocated to enhance healing and regeneration of affected spinal even peripheral nerve disorders to the rehabilitation phase. Clinical curiosity was to comparatively evaluate effect of LLL in healing and regeneration of experimental induced degeneration in spinal cord rat. The aim of this study was to evaluate the effects of LLL with of autologous undifferentiated neural stem cells on behavioral improvement in rats after inducing spinal cord injury
Methods&Material: The spinal cord was injured in 28 adult rats (4 groups of 8 rats each) with 8 to 12 weeks old by contusion using a Fogarty embolectomy catheter at the T8–T9 level of the spinal cord.Autologous MSCs (106 cells) were transplanted into the center of the developing lesion cavity, 3mm cranial and 3mm caudal to the cavity, at 7 days after induction of spinal cord compression injury in group (III). No treatment was given to group (I) used as control, whereas LLL with780 nm and 250 mW for 15 minutes for 15 days for group (II) and with combination of stem cells in group IV.The samples was collected from the site of injured area after a month for histomorpholgical interpretation.
Results: At 4 weeks after transplantation, the presence of transplanted cells was detected in the spinal cord parenchyma using immunohistochemistry analysis. In all treatment groups (II, III, IV) (LLL, undifferentiated and cells with LLL), there was less cavitation than lesion sites in the control group. The Basso– Beattie–Brenham (BBB) score was significantly higher in rats transplanted with a combination of cells and LLL (IV) than in undifferentiated (III) and control rats.
Conclusion: Undifferentiating of MSCs to neuron-like cells with LLL has a very important role in achieving the best results for functional improvement.

26B1000 Pinfildi

Abstract presentation

Title: **Effect of Low-Level Laser Therapy on Mast Cells in Viability of the Transverse Rectus Abdominis Musculocutaneous Flap**

Authors: Carlos E Pinfildi , Richard E Liebano, Bernardo Hochman, Milvia M.M.S.S. Enokihara, Rafael C Gobbato, Lydia M Ferreira

Background and objective
To assess the effect of low-level laser therapy (LLLT) on viability of mast cells of the transverse rectus abdominis musculocutaneous (TRAM) flap. Background Data: LLLT has been recently used on the TRAM flap to stimulate mast cells
Methods: Eighty four Wistar rats were randomly divided into seven groups of 12 rats in each: group 1 (sham laser therapy); group 2 received 3 J/cm2 at one point; group 3 received 3 J/cm2 at 24 points;

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