

# 3<sup>rd</sup> International Conference and Exhibition on Clinical & Cellular Immunology

September 29-October 01, 2014 DoubleTree by Hilton Baltimore-BWI Airport, USA

## Role of low intensity laser irradiation in the activation of the immune system towards diabetic wound healing *in vitro*

Sandra M Ayuk, N N Houreld and H Abrahamse  
University of Johannesburg, South Africa

**Background:** Low Intensity Laser Irradiation (LILI) is a non-invasive form of therapy that uses lasers of low energy. On application of these lasers to tissues, photochemical, biological and physical responses are stimulated in photoreceptor molecules within the cell. It produces cytokines and heat shock proteins which regulate the body's immune response locally and consistently. Studies have shown that the immune system is affected in people with 'slow to heal' wounds. This study is aimed to evaluate various genes involved in the ECM and the role of LILI diabetic wounded fibroblast cells.

**Method:** Normal (unstressed) and diabetic wounded (stressed) models of isolated human skin fibroblasts were used. The cells were incubated for 48 h after irradiation using a diode laser at a wavelength of 830 nm at a fluence of 5 J/cm<sup>2</sup>. Non-irradiated (0 J/cm<sup>2</sup>) normal and diabetic wounded cells served as controls. To determine the expression of 84 genes, real-time reverse transcription (RT) quantitative polymerase chain reaction (qPCR) was used in a PCR array.

**Results:** LILI mediated the expression of genes in the ECM and its adhesion molecules. Appropriate controls were used for gene profiling and showed significant increase and decrease in expression 48 h post-incubation. Sixty one genes were significantly regulated (55 up-regulated and 6 down-regulated) in normal cells; 42 genes were regulated (9 up-regulated and 33 down-regulated) in diabetic wounded cells. Several genes were seen to be down-regulated in diabetic wounded cells as compared to normal.

**Conclusion:** LILI stimulates gene expression of proteins involved in the ECM *in vitro* at 830 nm with a fluence of 5 J/cm<sup>2</sup> which may turn to trigger immune-response. A detailed understanding of the molecular aspects may create a breakthrough for LILI as an alternative treatment in difficulties to heal wounds.

### Biography

Sandra M Ayuk (AIMLT, Medical Laboratory Technology, UCTH, Calabar, Nigeria, BTech Hons, MTech, Biomedical Technology, University of Johannesburg, South Africa) is currently pursuing a Doctorate degree in Biomedical Technology, Laser Research Centre (LRC), University of Johannesburg. She is specialized in haematology and blood transfusion as well as laser interaction in wound healing focusing on diabetic wound healing. She has presented in several conferences both locally and internationally, and has published some of her works in peer-reviewed journals. She has recently received three merit awards from her research output and was also nominated as the President of the African Laser Congress (ALC) student association. She is also a member of World Association of Laser Therapy (WALT) and Cameroon Medical Laboratory Society (CAMELS).

[habrahamse@uj.ac.za](mailto:habrahamse@uj.ac.za)