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Gene Expression Changes in Diabetic Wound Healing as Induced by Photobiostimulation *in vitro*

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Diabetes Mellitus (DM) is a complex metabolic disorder resulting in hyperglycaemia. Impaired wound healing and eventual foot amputation is one of serious complications of diabetes, and is a severe public health problem. Photobiostimulation, Phototherapy or Low intensity laser irradiation (LILI) is a non-invasive form of treatment known to enhance healing of such wounds using lasers at low energy. This study aimed to evaluate the role of photobiostimulation at 830 nm on diabetic wounded fibroblast cells *in vitro* and extracellular matrix (ECM) gene expression. **Method**: Normal (N-unstressed), normal wounded (NW-stressed) and diabetic wounded (DW-stressed) fibroblasts were incubated for 48 h after irradiation using a continuous wave diode laser at a wavelength of 830 nm with 5 J/cm². Non-irradiated (0 J/cm²) N and DW-cells were used as controls. The gene expression profile (84 genes) was assessed using an ECM real-time reverse transcription polymerase chain reaction with the appropriate controls included. **Results**: Sixty one genes were significantly regulated (55 up-regulated and 6 down-regulated) in N-cells; 40 genes (20 up-regulated, and 20 down regulated) in NW-cells and 42 genes (9 up-regulated and 33 down-regulated) in DW-cells. Several genes were down-regulated in DW cells as compared to N and NW. **Conclusion**: Photobiostimulation modulated the expression of important genes in wound healing including cell adhesion molecules, integrins, ECM proteins, proteases, and inhibitors involved in the ECM. An in depth comprehension of the molecular and biological aspect may create an improved therapeutic protocol for diabetic wounds.

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Level for award (Hons, MSc, PhD, N/A)?

PhD

Main supervisor (name and email) and his / her institution

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