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A comparison between photobiomodulation at 830 nm and 660 nm on differentiation in diabetic human skin fibroblast cells

Different studies have proposed the efficacy of photobiomodulation (PBM) at different wavelengths (830 and 660 nm) to stimulate wound repair in diabetic cells. The TGF-β1/Smad cascade has proven to be an effective signalling pathway in differentiating fibroblasts into myofibroblasts. This study aims to compare the effects of both wavelengths on cellular viability and expression of fibroblast differentiation markers in WS1 fibroblast cells. The cells were modelled into groups; normal (N), normal wounded (NW) and diabetic wounded (DW). At 830 nm and 660 nm, cells were irradiated at 5 J/cm2, while control cells were without irradiation (0 J/cm2). At 24 and 48 h post-irradiation cell viability was investigated using trypan blue exclusion assay while TGF-β1 and p-Smad2/3 was ascertained using ELISA. Immunofluorescence was used to observe the presence of alpha smooth muscle actin (α-SMA). There was a significant increase in cell viability in the irradiated models using both wavelengths. A wavelength of 830 nm elicited a slight increase in the expression of TGF-β1 compared to 660 nm in diabetic wounded cells, both wavelengths had no effect on expression of p-Smad2/3. Both wavelengths were successful in initiating the differentiation of fibroblasts into myofibroblasts in diabetic wounded cells with no difference between wavelengths.

Apply to be considered for a student ; award (Yes / No)?

No

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N/A

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