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Photobiomodulated Differentiation Of Adipose Derived Stem Cells Into Osteoblasts.

Osteoporosis is a progressive, metabolic bone disease affecting millions across the globe. Stem cell regenerative therapy has demonstrated potential in treating osteoporosis, particularly when using Adipose Derived Mesenchymal Stem Cells (ADMSCs). Photobiomodulation (PBM) has gained international momentum due to its ability to aid in the proliferation and differentiation of stem cells. Additionally, PBM when combined with differentiation growth factors has revealed enhanced proliferation and ADMSC differentiation into osteoblasts. This in vitro study combined the use of osteogenic differentiation inducers and PBM at visible light wavelength of 525 nm using a single fluence of 5 J/cm² to determine the proliferation and differentiation effectiveness of ADMSCs into osteoblasts. The cells were characterised using both early and late osteoblast protein markers identified via the use of flow cytometry, spectroscopy and morphology. Results were analysed via morphology and biochemical analysis investigated through, viability, proliferation, Mitochondrial Membrane Potential and cellular migration rate. The successful outcome of this in vitro study will be to provide relevant scientific knowledge for osteogenic differentiation. Moreover, this study may reach clinical trials for use in the treatment of osteo-degenerative diseases like osteoporosis.

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

Yes

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

MSc

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