

Integrative Biology 2016: Adipose-derived stromal cell cluster with light therapy enhance angiogenesis and skin wound healing in mice - In-Su Park - Dankook University

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Human adipose-derived mesenchymal stem cells (hASCs), which are found in adipose tissue, are an attractive cell therapy source for the regeneration of damaged tissues because they are the ability of self-renewal and the ability to differentiate into various cell lineages.

Transplanting hASCs induces neovascularization and improves blood flow to ischemic tissue in animal models. In spite of the angiogenic potential of hASCs for treatment of ischemic wounds, these cell sources have limitations for therapeutic angiogenesis.

Although ASCs are favorable with regard to obtaining the number of cells required for transplantation, few transplanted stem cells have been found to differentiate into endothelial cells (ECs) and incorporate into vascular structures in ischemic sites. Thus, the foremost mechanism by which stem cells participate in tissue repair seems to be related to their trophic factors. Indeed, stem cells provide the microenvironment with a wide

range of growth factors, cytokines and chemokines, which can broadly defined as the stem cells secretome.

In in vitro condition, these molecules can be traced from the conditioned medium or spent media harvested from cultured cells. Conditioned medium now serves as a new treatment modality in regenerative medicine and has shown a successful outcome in some diseases. Low-level light therapy (LLLT) has been used for a long time for various purposes, such as reduce inflammation and improvement in the local circulation.

Moreover, many studies have demonstrated positive bio-stimulatory effects of LLLT on stem cells. The aim of this study was to investigate the effects of low-level light therapy (LLLT) on stem cells secretome. With the emergence of this approach, we described the possibility of using stem cells conditioned medium as a novel and promising alternative to skin wound healing treatment.