



WOUND HEALING

## **EXOSOMES PROMOTE SKIN WOUND HEALING**

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Backgrounds: Exosomes, 30-to 150-nm-sized extracellular vesicles secreted from most cell types, are formed within endosomal compartments and released into the extracellular milieu. It has been demonstrated that exosomes possess similar functional properties to those of mesenchymal stem cells (MSCs) from which they are derived and due to such functions, exosomes are regarded now as a communicator between tissues.

Objective: We would like to explore whether exosomes from mesenchymal stem cells (MSCs) could be used as a novel therapeutic option for wound healing.

Materials and Methods: Transmission electron microscopy (TEM) and nanoparticle tracking analysis (NTA) showed that exosome from adipose derived stem cell (ASC-exo) isolated from the supernatants of the ASC culture showed the typical morphology of exosomes. Western blot analysis revealed that ASC-exo expresses exosome markers HSP70, CD63 and CD9, while these markers were absent in ASC lysate.

We treated fibroblasts with these exosomes to assess their proliferation and migration.

We used microarray analysis to observe the microRNAs of ASC-exo, which was differentially present in ASC.

Results: We found that ASC-exo stimulates the proliferation of HDFs higher than 1.5-fold compared to control (P<0.05), and gene expression profiling of collagen type 1, elastin, KGF, CD34 and VEGF in HDFs were significantly increased when treated with ASC-exo (more than 3.2-, 12.3-, 13.2-, 36.5-, and 4.6-fold, respectively, P<0.05).

Migratory capacity of HDFs was assessed to increase more than 7-fold after they were incubated with ASC-exo, and cell cycle analysis by FACS demonstrated that ASC-exo treatment significantly increased the population of cells in S-phase.

Microarray analysis showed an enrichment of microRNAs that have regenerative function.

Conclusion: Our findings show that the ASC-exo can promote the regeneration of dermal fibroblasts during the wound healing process. This result may be useful for developing novel therapeutic methods for the enhancing wound healing.





