

**Investigating the effects of bio-synthesized platinum nanoparticles on viability of mesenchymal stem cells cultured on human acellular dermal scaffold**

**Fatemeh Shirdel1, Ahmad Reza Bahrami1,2, Mansour Mashreghi1,2, Maryam M. Matin1,3\*, ...**

**1** Department of Biology, Faculty of Science, Ferdowsi University of Mashhad, Mashhad, Iran

**2** Industrial Biotechnology Research Group, Institute of Biotechnology, Ferdowsi University of Mashhad, Mashhad, Iran

**3** Novel Diagnostics and Therapeutics Research Group, Institute of Biotechnology, Ferdowsi University of Mashhad, Mashhad, Iran

**\*Corresponding Author:** Maryam M. Matin (matin@um.ac.ir)

## Aim and Background: The human skin, as the largest organ of the body, is always exposed to many damages, and the improvement of healing strategies is an essential need. Tissue engineering and nanotechnology, which are well known as the main breakthroughs in skin regeneration, can improve the triangle interaction of cells, scaffolds, and growth factors in dermal environment. This study implies the seeding of hTERT-MSCs - the immortal human telomerase reverse transcriptase mesenchymal stem cells - on human acellular dermal matrix (hADM), and the effects of platinum nanoparticles (PtNPs), with a historical background in Japanese wound healing, in order to increase the cell viability.

## Methods: PtNPs were biosynthesized from a native Vibrio isolate and characterized by various methods including DLS, zeta potential, FTIR, and XRD. The hTERT-MSCs were then treated with different concentrations of the PtNPs to assess their cytotoxicity via MTT assay. In the next step, PtNPs were loaded on 3D hADMs (skin samples were decellularized using an enzymatic-chemical process) and cell viability was measured on days 3, 5, and 10.

## Results and discussion: The results confirmed the successful green-synthesis of PtNPs, with the average size of 51 nm. Moreover, the NPs could effectively enhance the viability of hTERT-MSCs both in 2D and 3D culture systems.

## Conclusion: In conclusion, PtNPs, as noble metal nanoparticles, are biocompatible and can improve cell survival in dermal models, so they can be helpful in skin regeneration.

## Keywords: platinum nanoparticles, hTERT-MSCs, acellular dermal matrix, skin regeneration

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