



Treatment with Allogenic Bone Marrow-Derived Mesenchymal Stem/Stromal Cells Enhances Wound Healing upon Frostbite Injury on a Rat Model

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Abstract:

Frostbite is one the most common type of traumatic injuries in the cold climate of the north countries. Post-traumatic recovery of the patients takes a long time and often leads to the loss of the damaged limb. A promising approach for frostbite therapy could be treatment with mesenchymal stem/stromal cells (MSCs), which are widely used in regenerative medicine for different applications. Here, we aimed to estimate the possibility of frostbite treatment with allogenic MSCs from bone marrow. The cells were isolated from bone marrow of 10-week old Wistar rats and cultivated for 3-4 passages at hypoxic conditions with 5 % of oxygen in atmosphere. The cells demonstrated CD105+, CD73+, CD90+, CD44+, CD45-, CD34- phenotype, ability to differentiation in adipogenic, chondrogenic and osteogenic directions and higher extent of anti-inflammatory molecule and growth factor expression compared with MSCs, grown at normoxic conditions. The wounds on the left hip of Wistar rats were generated using a metal rod frozen in liquid nitrogen with a diameter of 12 mm. On the next day, 2 million hypoxia-exposed MSCs were intramuscularly injected around the wounds. It was found that treatment with MSCs enhanced wound healing via promotion of expression of anti-inflammatory molecules, neovascularization and reepithelialization. Thus, the use of hypoxia-exposed MSCs could be a valuable strategy for frostbite recovery.

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Biography:

Mikhail O. Durymanov working as Associate Professor at Moscow Institute of Physics and Technology located at Dolgoprudny, Russia. He has done more than 15 Publications .

Publication of speakers:

- Mikhail O. Durymanov et al ; Microdistribution of MC1R-targeted polyplexes in murine melanoma tumor tissue, 2013 Sep 27
- Mikhail O. Durymanov et al ; Subcellular trafficking and transfection efficacy of polyethylenimine-polyethylene glycol polyplex nanoparticles with a ligand to melanocortin receptor-1, 2012 Sep 1
- Mikhail O. Durymanov et al ; Current Approaches for Improving Intratumoral Accumulation and Distribution of Nanomedicines, 2015 Jun 8
- Mikhail O. Durymanov et al ; Non-viral delivery of nucleic acids: Insight into mechanisms of overcoming intracellular barriers, 2018 April 13
- Mikhail O. Durymanov et al; Role of endocytosis in nanoparticle penetration of 3D pancreatic cancer spheroids, 2019 Oct 10

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