



Mesenchymal stem cells proliferation and remote manipulation upon exposure to magnetic semiconductor nanoparticles

Tudor Braniste, Vitalie Cobzac, Polina Ababii, Irina Plesco, Simion Raevschi, Alexandru Didencu, Mihail Maniuc, Viorel Nacu, Ion Ababii, Ion Tiginyanu

<https://doi.org/10.1016/j.btre.2020.e00435>

Abstract

In this paper, we report on spatial redistribution of bone marrow mesenchymal stem cells loaded with magnetic nanoparticles under the influence of continuously applied magnetic field. Semiconductor nanoparticles were synthesized by epitaxial growth of a GaN thin layer on magnetic sacrificial core consisting of ZnFe₂O₄ nanoparticles. Different quantities of nanoparticles were incubated in vitro with mesenchymal stem cells. High density of nanoparticles (50 µg/ml) leads to a decrease in the number of cells during incubation, while the density of nanoparticles as low as 10 µg/ml is enough to drag cells in culture and rearrange them according to the spatial distribution of the magnetic field intensity.