

Neural differentiation of bone marrow mesenchymal stem cells incorporated with MNPs in the presence of adhesive substrates

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BM-MSCs have been proposed as an optimal source for neural tissue repair and regeneration. Extracellular matrix (ECM) plays an important component of cellular environment and regulation of stem cell differentiation, so MSCs are known to be strongly affected by the culture substrates. Recently, magnetic iron oxide nano particles (MNPs) have been suggested new method for neural cell transplantation because MNP-labeled cells are non-invasive imaging for cell tracking and can delivery of therapeutic bio-molecules strongly. So, we investigated the neural differentiation potential of hBM-MSCs based on various polyacrylamide gel substrates that were coated with ECM proteins. In case of cells cultured onto laminin, they exhibited neural-like morphology after 1 day more than any other ECM proteins. Furthermore, we found the groups of BM-MSCs incorporated with MNPs have more significant morphological change of neural differentiation than control group according to cell morphology, RT-PCR and western blotting. Therefore, we can conclude that MNPs can potentially be developed for neural cell transplantation in the presence of laminin.