lity with NSCs and their cell labeling efficiency in vitro when compared to both their uncoated γ-Fe2O3 counterparts and commercially available dextran-coated nanomag®-D-spio nanoparticles. Finally, we used poly(L-lysine)-γ-Fe2O3 and (D-mannose)-γ-Fe2O3 nanoparticles to label NSCs which were transplanted into mouse post-ischemic brain and tracked during brain repair using magnetic resonance. Both poly(L-lysine)-γ-Fe2O3 and (D-mannose)-γ-Fe2O3 could easily be visualized in ex vivo mouse post-ischemic brain, making them an attractive agent for future NSC in vivo tracking studies.

GlowBrain here presents a platform which allows in vitro and in vivo investigation of biocompatibility of biomaterials that can serve as support for NSCs, ultimately allowing their survival and differentiation in post-ischemic brain. Moreover, our platform can be used to assay in vitro the effects of labeling NSCs with differently coated γ-Fe2O3 nanoparticles, namely cell viability and proliferation, cellular uptake efficiency and labeling mechanism as well as potential to be visualized in vivo in mouse ischemic brain.

OPTIMIZATION OF CONDITIONS FOR IN VITRO THREE-DIMENSIONAL CARTILAGE GROWTH

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Articular cartilage is a poorly vascularized and innervated tissue that shows no capacity for effective spontaneous regeneration in cases of damage and injury, which represents a major health problem and unmet medical need. Common methods of the treatment and therapy have proved to be ineffective. Tissue engineering, as a new important field of regenerative medicine, emerges as potential effective alternative. Chondrogenesis, the process by which cartilage is formed, actually represents the consequence of several steps directed by signaling molecules, receptors, transcription factors, cells' interaction with ECM and other environmental factors. In this respect, the aim of our study was to optimize conditions for 3D in vitro chondrogenesis in order to produce functional cartilage implants that could be used in clinical practice to cure some specific cartilage defects.

The method of optimization includes: i) cell type; ii) source of dexamethasone; and iii) percentage of oxygen. In the experiment three different cell culture types were used: chondrocytes, human mesenchymal stem cells from bone marrow (hMSC) and combination of chondrocytes and hMSC in 2:1 ratio. Cells were grown in 3D culture, incorporated in a peptide hydrogel RADA (BD PuraMatrix Peptide Hydrogel). In order to induce chondrogenesis, cells were put in a differentiation medium containing ascorbic acid-2-phosphate, L-proline, ITS, TGFβ-1 and dexamethasone. Dexamethasone was added in a differentiation medium or it was incorporated with cells within a peptide hydrogel. In order to demonstrate the effect of oxygen level on the efficiency of chondrogenic differentiation, cells were grown in normoxic (20% O2) and hypoxic conditions (5%O2). Expression levels of two important cartilage marker genes, SOX9 and agreccan, were evaluated by quantitative PCR in samples on day10 and day21 after induction of chondrogenesis.

Our results provide important insights into effects of how different cell type, dexamethasone source and oxygen level affect efficiency of in vitro chondrogenesis.

PLATELET RICH PLASMA IN THE TREATMENT OF SPORTS INJURIES: INDICATATIONS AND TECHNIQUE

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Platelet-rich plasma (PRP) due to its role in wound healing, has spanned various fields of orthopaedics and sports medicine . Among athletes muscle injuries are common and may be associated with impaired functional capacity. The vulnerability of athletes to strains and contusions represents a substantial problem for professional players and their clubs. Such injuries involve significant time lost from training and competition. Presently there are no drugs available to hasten restoration of muscle function after injury and the results of healing with conventional therapy including rest, ice, compression, and elevation (RICE) are often inadequate. Therefore platelet-rich plasma (PRP) therapies may help athletes by promoting muscle regeneration , enhancing the process of soft-tissue healing and to decrease time to recovery.PRP is generally considered an elective treatment for subacute and chronic conditions. In orthopaedics and sports medicine is used to treat tendinopathies, ligament sprains, muscle strains, degenerative joint conditions. PRP is obtained from a sample