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Human adipose derived mesenchymal stem cells (ADMSC) for cartilage repair: in vitro use of Gelfoam® hydrogel  
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**Purpose:** Agarose alginate hydrogel (Gelfoam®) was used successfully as a matrix for autologous chondrocyte implantation. It presents interesting scaffold characteristics for tissue engineering: 3D environment allowing differentiation, stabilization and homogenous distribution of the cells. The potential of the ADMSC included in this hydrogel instead of chondrocytes was evaluated in vitro at www.nature.com.  

**Methods and Materials:** Cells are extracted from adipose tissue and then cultivated at different initial plating density in a plastic culture flask in expansion medium (containing of 10% calf bovin serum and 1ng/ml fibroblast growth factor 2). After 1 week, cultivated ADMSC were analyzed for phenotypic studies by flow cytometry with detection of specific ADMSC markers (CD73, CD90, CD105). Functionality was studied by: • Clonogenic assays: Quantification of CFU-f (colony forming unit cells), • Phenotype tests: culture of ADMSC included in gel in chondrogenic medium. After 3 weeks, gels were analyzed by immunohistochemistry (aggrecan and collagen II).  

**Results:** Optimal plating density correspond to 10.10^3 ADMSC/cm^2. ADMSC phenotype was positive for CD73, CD90, CD105 markers. Expanded ADMSC presented a high clonogenicity at least equivalent of CFU-f (colony forming unit cells). Functionality was studied by: • Clonogenic assays (colony formation units), • Phenotype tests: culture of ADMSC included in gel in chondrogenic medium. After 3 weeks, gels were analyzed by immunohistochemistry (aggrecan and collagen II).  

**Conclusions:** The use of ADMSC included in Gelfoam shows in vitro promising results which would make possible to avoid the articular cartilage replacement. The process of heating to a high temperature is not an ideal setting. The use of ADMSC included in Gelfoam shows in vitro promising results which would make possible to avoid the articular cartilage replacement. The process of heating to a high temperature is not an ideal setting.

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Isolation, expansion and chondroblastic/osteoblastic differentiation of human adipose-derived mesenchymal stem cells obtained by density gradient in surgical room.  
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**Purpose:** Mesenchymal Stem Cells (MSCs) are capable of differentiating into chondroblast and osteoblast and eventually forming cartilage. The possibility could be possible use of MSCs to repair osteochondral defects. Ideally for further applications in Cellular Therapy, the MSCs must be obtained during the surgical procedure. Purpose: To evaluate the ability to obtain human bone marrow derived MSCs (hBMSCs) in a surgical room by Density Gradient (DG).  

**Methods and Materials:** Isolation of hBMSCs: In a surgical time an iliac puncture was performed and bone marrow aspirated was collected (15 ml). DG was performed and a mononuclear cell level (MCL) was obtained. To determine the presence of MSCs in the MCL, this portion was expanded and differentiated in our laboratory. Osteogenic Differentiation Medium: dexamethasone, b-glycerophosphate, and ascorbic acid-2-phosphate. Osteogenic differentiation was evaluated by alkaline phosphatase (AP) and histology. Chondrogenic Differentiation Medium: ITS-Premix, TGF-b1 and ascorbic acid. Chondrogenic differentiation was evaluated by Western blot for collagen.  

**Results:** DG: Successful, 3 ml of MCL was obtained. Isolation of hBMMSCs: mononuclear cells concentration: 9.000.000 cells/ml. Time to achieve confluence (80%): 18 days. MSCs at the end of culture: 28.000 cells/cm^2. Osteoblastic Differentiation: Time to differentiation: 14 days. AP histochemistry: positive. Chondrogenic Differentiation: Western blot collagen II: positive.  

**Conclusions:** Is possible to obtain MSCs by DG in surgical room. These MSCs had the osteogenic and chondrogenic capacity. This methodology could be applied to the cellular therapy in the clinical setting.