

Mesenchymal stem cells from adipose tissue differentiated in chondrocytes into three-dimensional clusters termed chondrocyte “nodules” express lubricin

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Lubricin is recognized to have an important role in preventing cartilage wear and synovial cell adhesion and proliferation. This study focused on isolation, cultivation, characterization of mesenchymal stem cells (MSCs) from adipose tissue and on their differentiation into chondrocytes through the NH ChondroDiff Medium. The main aim was to investigate some biochemical markers, such as collagen type I and II and lubricin verify the possibility to suggest of employing autologous three-dimensional clusters termed chondrocyte “nodules” in cartilage repair. Three-dimensional chondrocyte “nodules” were assessed with histology (haematoxylin and eosin), histochemistry (Alcian blue and Safranin-O/fast green) and Hoechst 33258 staining. Collagen type I, II and lubricin expression was determined by immunohistochemistry, immunofluorescence and Western blot. The results showed that, compared to control cartilage and monolayer chondrocytes showing just collagen type I, chondrocytes from MSCs (CD44, CD90 and CD105 positive; CD45, CD14 and CD34 negative) of adipose tissue grown in “nodules”, at 24 days, were able to express lubricin, collagen type I, and II, indicative of hyaline cartilage formation. Based on the function of lubricin in the joint cavity and disease and as a potential therapeutic agent, our results suggest the possibility of applying autologous cell transplantation from adipose tissue differentiated in chondrocyte “nodules”.

Keywords: adipose tissue; autologous transplantation; cartilage repair; chondrocytes; MSCs.