Comparison of chondrocyte cells survival in alginate and throat fibrin scaffolds using mtt assay for repair and treatment of cartilage.

Authors: Mokhtari S., Nasrabadi M.H.

Publication Date: 2016

Abstract:

Introduction and Objectives: Arthritis or osteoarthritis is the most common disease that is counted as the category of arthritis in which the joint cartilage is hurt and gradually disappeared. Cartilage is a tissue that has a limited self-repair ability. Thus, different methods have been recommended for its reconstruction and repairing. One of these methods is cell-scaffold system in which selection of cell type as well as kind of scaffold is very important in tissue engineering. Therefore, in this research we aimed to consider the chondrocyte cells viability in vitro conditions on two different scaffolds including alginate and fibrin glueand monolayer. Materials and methods: In this study, after collection and extraction of chondrocyte cells from human cartilage, cellular culture is provided. Different scaffolds of alginate and fibrin glue were provided and then cellular suspensions were added to theses scaffolds. After fourteen days (37 degrees, 5% CO2, humidity 99%), the percentage of living cells was evaluated using MTT assay. Data were analyzed using SPSS software. Results: The most of living cells were observed in fibrin glue scaffold (mean absorbance of 0.779333+/-0.13299 at 570nm), which was significantly higher than that in alginate scaffold (mean absorbance of 0.308667+/-0.039107 at 570nm) ($p<0.05$). Conclusions: Culture, viability and proliferation of chondrocytes cells in the fibrin glue scaffold is more suitable to compare with the alginate scaffold that may be because of its natural structure. Since fibrin glue is extracted from human blood, it secrets some growth factors that are responsible for higher time duration and percentage of living cells in the fibrin glue scaffold than the alginate. Therefore, it can be said that the fibrin glue is a good candidate for cartilage reconstruction and repair in tissue engineering.

However, it merits further study in animal model or in vivo conditions and the proliferation of fibrin scaffolds throat with a higher confidence level leads higher levels of health.