

Use of Bio Printing System for Osteochondral tissue reconstruction

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Articular cartilage is a specific tissue, because of limited blood supply, it difficult to be healed. Therefore, we applied bio printing system to fabricate osteochondral tissue. To culture and evaluate osteochondral tissue, polydimethylsiloxane (PDMS) chamber system was designed. In this study, polycaprolactone (PCL) and alginate were adopted as materials for fabricating scaffold matrices, which was mixed with high density of cells (5×10^6 cells/ml). Fetal cartilage derived progenitor cells (FCPCs) were used for osteochondrogenesis. To confirm cytocompatibility, CCK-8 and live/dead assay was conducted at days 1, 7. For osteochondrogenesis, alkaline phosphates (ALP) activities and glycosaminoglycan (GAG) contents were measured at days 7, 14. Moreover, osteochondral tissue formation were also observed at day 14. Current results showed that the PDMS chamber system integrated 3D bio printing system may be applied as a good in vitro model in reconstruction of artificial osteochondral tissue.

Keywords: polycaprolactone, alginate, polydimethylsiloxane chamber system, bio printing system, osteochondral tissue