Proliferative and redifferentiation activities of loose fragment-derived chondrocytes in OCD and SONK

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Loose fragments in osteochondritis dissecans (OCD) of the knee require internal fixations. On the other hand, loose fragments derived from spontaneous osteonecrosis of the knee (SONK) are usually removed. However, the difference in healing potential between these fragments has not been elucidated. In this study, we investigated proliferative activity and redifferentiation potential of normal cartilage- and loose fragment-derived chondrocytes.

Cells were prepared from normal articular cartilages and loose fragment cartilages derived from knee OCD and SONK. Cellular proliferation was compared. Redifferentiation ability of pellet-cultured chondrocytes was assessed by real-time PCR analyses. Mesenchymal differentiation potential was investigated by histological analyses. Positive ratio of a stem cell marker CD166 was evaluated in each cartilaginous tissue.

Normal and OCD chondrocytes showed a higher proliferative activity than SONK chondrocytes. Chondrogenic pellets derived from normal and OCD chondrocytes produced a larger amount of safranin O-stained proteoglycans compared with SONK-derived pellets. Expression of chondrogenic marker genes was inferior in SONK pellets. CD166-positive ratio was higher in normal cartilages and OCD loose fragments than in SONK loose fragments.

SONK chondrocytes were inferior in proliferative activity and redifferentiation potential compared with OCD chondrocytes. Our results suggest that SONK-related loose fragments are not useful materials for regeneration therapy of osteochondral defects.

Key words: chondrocytes, loose fragment, redifferentiation