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HOFFA'S FAT-KEY TO UNLOCK CARTILAGE REGENERATION

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Osteoarthritis is the most common progressive degenerative disease affecting the knee joint. Osteoarthritis represents a disease where the prospects of stem cell based therapy offers considerable hope. Hoffa's fat aka infra patellar fat pad (IPFP) an intra-articular and extra synovial structure in the knee joint are capable of chondrogenic differentiation and this property can be exploited to address the damage to the articular cartilage. Stem cells obtained from IPFP were analyzed based on various cellular characteristics, such as the yield, viability, growth kinetics, colony-forming ability and expression of selected phenotypic markers. The fat pad samples with prior consents were obtained from patients who presented for primary total knee arthroplasty to the Department of Orthopedic Surgery at K S Hegde Medical Academy. The fat pad samples were processed at the Stem Cell Laboratory at KSHEMA. A total of five samples were used for the establishment of stem cell lines. Nucleated cell number per one gm fat tissue ranged from 0.36 million to 1.05 million and total adherent cell number after 14 days culture per one gm fat tissue was varied from 0.3 million to 1.0 million, showing the potential of high yield. Isolated cells exhibited small spindle-shape morphology and the viability was >97.5% at all passages examined (P1-P3). Proliferation rate of IPFP-stem cells was high and average population doubling time was found to be 66.32±6.60 hrs. As a potency marker, IPFP-stem cells showed high colony formation ability. Flow cytometry analysis revealed that cell populations were over 70% positive for the mesenchymal stem cell (MSC) markers, such as CD29, CD44, CD73 and CD90, but CD146 and CD166 showed only <10% positivity. In addition, IPFP stem cells are also being assessed for their chondrogenic potential. To conclude, IPFP derived stem cells have rich yield and viability and were shown to be highly proliferative with expression of phenotypic markers specific to multipotent stem cells.

BIOGRAPHY

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