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Characterization and histological analysis of tissue specific markers in primary cell cultures of human articular cartilage grown on 2 & 3 dimensional substrates

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Articular Cartilage injuries and malformations are commonly noticed due to trauma or age-related degeneration. Many different methods have been adopted for replacing/repairing the damaged tissue. Currently available methods have often proven inadequate to achieve long-lasting and good quality cartilage tissue regeneration, possibly because of a mismatch between the cartilage regeneration process and resorption of implanted polymers. To improve this process, we have developed a novel methodology for culturing articular cartilage cells in 2 & 3 dimensional cultures. The primary cells from normal human articular cartilage was isolated and seeded into 2mm thick collagen 1 gels placed in 6-well culture inserts and cultured upto 30days. The cultures were maintained in either Fetal Bovine Serum (FBS) or Human Umbilical Cord Serum (UCS) containing medium with the change of media twice a week. Cartilage formation occurred within 30days and its properties were analysed by histology, Immunohistochemistry and Scanning Electron Microscopy. Gene expression profiling of regenerated cartilage was done using RT-PCR analysis for Aggrecan, Collagen II, Collagen I, Sox9, Syndecan3, CD151. Cells grown in UCS containing medium showed better cell number and maintenance of the chondrocyte cell lineage than in FBS containing medium. These results were confirmed by comparative molecular characterization and histochemical studies.

Our study presents a novel, reproducible, efficient and robust method for long-term culture of articular cartilage cells. Our methodology permits the generation of large number of articular cartilage cells for studying the molecular controls operating during chondroblast to chondrocyte differentiation and cell survival.

Biography

Vibudha Nanduri, had completed her Masters in Biotechnology at the age of 23 years from Osmania University, Hyderabad, India with distinction. She is working as a Research Assistant in the ICMR fellowship (GAP0383) under the supervision of Dr. Gopal Pande in CSIR-Centre for Cellular & Molecular Biology (CCMB), a unit of Council for Scientific and Industrial Research (CSIR), India.

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