

## DERIVATION, CHARACTERIZATION AND EXPANSION OF CHONDROPROGENITORS ON DIFFERENT MICROCARRIERS

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**Introduction:** Microcarrier technology has been applied successfully in the cultivation of mammalian anchorage-dependent cells for decades. The principal obstacle of microcarriers has been the difficulty in detaching cells from the microcarriers in a viable and functional condition. Traditional enzymatic methods for cell recovery from microcarriers are often time- and labor-consuming and can cause physiological damage to cells. However, thermoresponsive biomaterials can induce the detachment of cells simply by lowering the temperature and thereby avoiding the use of deleterious proteases. **Materials and Methods:** In this study, we cultured cells on 3 different microcarriers: Commercially-available Cytodex-1 and Biosilon microcarriers and thermosensitive PHEMA-PNIPAAm microcarriers produced by Gumusderelioglu et al. Collagen type 2 positive chondroprogenitors were derived from the articular cartilage of 3-month-old fetus by explant culture and cultured on microcarriers for 2 weeks. Growth kinetics of cells were estimated using population doubling time and MTT assay. Scanning electron microscopy (SEM) imaging techniques have been employed to observe cell-biomaterial interactions.

**Results:** Results showed that attachment efficiency varied between 88,6 % and 98,7 % according to the type of microcarrier. Cell attachment and proliferation rates indicate that thermosensitive PHEMA-PNIPAAm exhibited a high level of biocompatibility rendering it a good candidate for cell scale up. Detachment from microcarriers was induced by cold PBS treatment for 20 minutes or pronase treatment for 15 minutes. Detached cells from commercial microcarriers by pronase application and detached cells from thermosensitive spheres by cold inducement showed similar proliferative activity when transferred to monolayer cell culture system.

**Conclusions:** Our results show that 'thermosensitive microcarrier model' may provide an attractive solution to the cell scale up process.

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