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Development of Xeno-free culture system for human Periodontal Ligament Stem Cells

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The opportunity of transplanting adult stem cells into damaged organs has opened new prospectives for the treatment of several human pathologies. Aim of this study was to develop a culture system for the expansion and production of human Periodontal Ligament Stem Cells (hPDLSCs) using a new xeno-free media formulation ensuring the maintenance of the stem cells features comprising: the multiple passage expansion, mesengenic lineage differentiation, cellular phenotype and genomic stability, essential elements for conforming to translation to cell therapy[1].

Somatic stem cells were isolated from the human periodontium using a minimally invasive periodontal access flap surgery. Expanded hPDLSCs in a xeno-free culture showed the morphological features of stem cells, expressed the markers associated with pluripotency, and a normal karyotype. Under appropriate culture conditions, hPDLSCs presented adipogenic and osteogenic potential; indeed, a very high accumulation of lipid droplets was evident in the cytoplasm of adipogenic induced cells, and indisputable evidence of osteogenic differentiation, investigated by transmission electron microscopy, and analyzed for gene expression analysis has been shown[2]. Our results prove that the novel xeno-free culture method might provide the basis for GMP culture of autologous stem cells, readily accessible from human periodontium, and can be a resource to facilitate their use in human clinical studies for potential therapeutic regeneration.

References

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Keywords

Adult Stem Cells, Cell Differentiation, human Periodontal Ligament, Gene Expression Profiling, 2-D Cell Culture.