

Human serum enhance proliferation of adipose-derived stem cells and supports osteogenic differentiation on PHB-HV scaffolds

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The characteristics of mesenchymal stem cells (MSC) make them interesting to be used in therapies for bone pathologies. These cells associated with scaffolds and factors in tissue engineering approach offer a strategy to circumvent some therapeutic problems. Currently, MSC are being introduced in several clinical trials for tissue repair. An ex vivo expansion of these cells is necessary before clinical application. However, the standard procedure for in vitro culture uses fetal bovine serum (FBS) as cell culture supplement which is a risk of cell contamination that can elicit immunological responses. Therefore, this study investigated the effects of allogeneic human serum (aHS) compared to FBS to maintain the proliferation and differentiation of human adipose-derived stem cells (hASC). Additionally, the osteogenic differentiation of hASC seeded on poly-hydroxybutyrate-co-3-hydroxyvalerate (PHB-HV) scaffolds. The hASC obtained from lipoaspirates (Ethical Approval 0023.0.203.000-11) were cultured in medium supplied with aHS or FBS. The cells were evaluated regard their immunophenotype by flow cytometry, proliferation capacity, viability by MTT assay and for differentiation capacity. PHB-HV scaffolds were developed by freeze-drying technique and characterized by μ CT, SEM and EDS. The hASC were seeded on scaffolds and cell adhesion and osteogenic differentiation were assessed. The results showed increased proliferation under aHS medium with maintenance of immunophenotype and differentiation capacity. The PHB-HV scaffolds have an adequate structure allowing cell adhesion and osteogenic differentiation of hASC. In conclusion, aHS is a suitable supplement to culture hASC for clinical use and the construct proposed seems useful and safety to bone tissue engineering. CNPq, FAPEMIG, CAPES.

Biography

Ana Cláudia Chagas de Paula was born in Ouro Preto (Brazil) in 1987. Graduated in pharmacy by Federal University of Ouro Preto in 2009. She has completed her Master degree at Biochemistry and Immunology by Federal University of Minas Gerais (UFMG) in 2011. Currently she is PhD student of Laboratory of Cellular and Molecular Immunology of UFMG. She started her research career in water quality and toxins area. Now her interests are in immunological approaches for cell culture, mainly stem cell, as well as bone tissue engineering. She has published 2 papers in her short research career.

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