

عنوان مقاله:

Xeno-free culture condition for human bone marrow and umbilical cord matrix-derived mesenchymal stem/stromal cells using human umbilical cord blood serum

محل انتشار:

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خلاصه مقاله:

Background: Fetal bovine serum (FBS) is widely used in cell culture laboratories, risk of zoonotic infections and allergic side effects create obstacles for its use in clinical trials. Therefore, an alternative supplement with proper inherent growthpromoting activities is demanded. Objective: To find FBS substitute, we tested human umbilical cord blood serum (hUCS) for proliferation of human umbilical cord matrix derived mesenchymal stem cells (hUC-MSCs) and human bone marrow-derived mesenchymal cells (hBM-MSCs). Materials and Methods: Umbilical cord blood of healthy neonates, delivered by Caesarian section, was collected and the serum was separated. hUC-MSCs and hBM-MSCs were isolated and characterized by assessment of cell surface antigens by flow cytometry, alkaline phosphatase activity and osteogenic/adipogenic differentiation potential. The cells were then cultured in Iscove's Modified Dulbecco's Medium (IMDM) by conventional methods in three preparations: 1- with hUCS, 2- with FBS, and 3- without serum supplements. Cell proliferation was measured using WST-1 assay, and cell viability was assessed by trypan blue staining. Results: The cells cultured in hUCS and FBS exhibited similar morphology and mesenchymal stem cells properties. WST-1 proliferation assay data showed no significant difference between the proliferation rate of either cells following hUCS and FBS supplementation. Trypan blue exclusion dye test also revealed no significant difference for viability between hUCS and FBS groups. A significant difference was detected between the proliferation rate of stem cells cultured in serum-supplemented medium compared with serum-free medium. Conclusion: Our results indicate that human umbilical cord serum can effectively support proliferation of hBM-MSCS and hUC-MSCs in vitro and can be used as an appropriate substitute for FBS, especially in clinical studies

کلمات کلیدی:

Bone marrow, Cell proliferation, Cord blood, Mesenchymal stem/stromal cells, Umbilical cord, Wharton jelly

