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Differentiation of osteogenic cells from umbilical cord mesenchymal stem cells: Comparing two enzyme digestion methods

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Mesenchymal stem cells (MSCs) are plastic adherent, fibroblast like cells with specific surface phenotype having ability to differentiate into osteoblasts, chondroblasts and adipocytes *in vitro*. Umbilical cord (UC) is a readily available without ethical constraints, showing high proliferation rate and osteogenic potential. To derive MSCs from the human UC Wharton's Jelly (WJ) and osteogenic differentiation was my main objective. Following obtaining ethical approval, five UCs from healthy mothers undergoing elective caesarian sections were collected, cleaned with phosphate buffered saline, removed blood vessels, digested WJ in 0.5% collagenase 2-3 hours/0.2% collagenase overnight and cultured in DMEM supplemented with 10% FBS, 1% L-glutamine and 1% Pen Strep at 37 °C in 5% CO_2. Cells are passaged at 70% confluency. At fourth passage (P4), osteogenic differentiation medium was added following incubation. Culture maintained for 21 days and cells were stained with 2% Alizarin red and von Kossa stains. MSCs were determined and characterized using Trypan blue test, Flow cytometry, RT-PCR and karyotypic analysis. Cells were positive for CD90, CD73 and CD105 and negative for CD34 and CD45 markers expressing Oct-4 and G6PD genes. Karyotypes depicted were normal. Alizarin red stain gave bright orange red and von Kossa stain gave black brown deposits demonstrating the presence of extracellular calcium deposits. UC-MSCS serves as a suitable source for osteogenic regeneration. Gene expression demonstrated the embryonic origin of the MSCs which maintained genomic stability up to P4 stage. So my initiative stem cell research in Sri Lanka improves the therapeutic potential in bone defects and opens up new perspectives for bone tissue engineering.

Biography

Zahara Mansoor has completed her Masters in Stem Cell Technology and Regenerative Medicine at the Faculty of Medicine, University of Colombo in 2016. She is one of the pioneering Stem Cell Scientist in Sri Lanka where stem cell is still at its infancy stage. Prior to this, she has successfully completed Bachelor of Science in Biotechnology from Bangalore University. She has also won the 2nd place for the Best Poster Presentation at The Annual Research Symposium, University of Colombo, 2015. Her interest is to explore research opportunities in the field of Regenerative Medicine.

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