

Human Umbilical Cord Tissue Derived Mesenchymal Stem Cells and Stem Cell Conditioned Medium and their potentials towards regenerative application

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Abstract:

Stem-cell therapy specially the umbilical cord-mesenchymal stem cells (UC-MSCs) is a emerging alternative to treat progressing tissue damage by reorganising the underlying disease process and to repair injured tissues, home to inflamed sites and involves least ethical concerns. Numerous questions need to be justified before MSCs derived from UC and their conditioned-medium can be applicable for the therapy of diverse diseases/conditions.

Stromal cells from human umbilical cord were characterised for CD29, CD105, CD73, CD166, CD271 and CD44 expression, CFU-F potential, wound assay potential and tri-lineage differentiation potential. Gene expression of Sox9, Oct4, Nanog, Colla1a1, Fmod, Nestin, Angplt1, CXCL2, IGF1, CDK6, p21, CyclinD1 and Wnts, were analysed in UCMSCs. UCMSC conditioned-medium was obtained after 7 days culture of UCMSCs and was characterized by HPLC, GC-MS and cytokine immune assay and thereafter treated in human keratinocyte cells (HaCaT) and co cultured with colon cancer cells for 10-12 days.

Early passage UC-MSCs exhibited greater proliferative ability, migration and wound healing potentials with higher MSC surface marker expression. UC-MSCs were found to differentiate towards osteogenic, adipogenic and chondrogenic lineages. The conditioned-medium from UC-MSC aided in modulating the HaCaT cells into stem cell-like cells through formation of straps between the cells, imperative for communication. Continuous treatment of HaCaT cells by conditioned medium traverse them towards adipocytic lineages and when the cells were cultured in 1:4 ratio of more colon cancer cells a prominent change in the phenotype of MSC's towards a cancer associated fibroblast were observed.

Vivid characterisation of UCMSCs is essential for summarizing the impact of stem cell based therapies and their challenges towards clinical applications. Validating the role of conditioned-medium on skin cells and colon cancer cells might open an interesting avenue for further translation of this medium in therapy of various age- related diseases.



Biography:

Dr. Antara Banerjee is working as an Associate Professor at Faculty of Allied Health Sciences, CARE, India. She completed her Ph.D from India and pursued her Post-Doctoral research at University of Padova, Italy and University of Linkoping, Sweden. Her research areas includes Regenerative biology, Stem cell Biology and Oncology. She has around 20 years of experience in the field of regenerative biology and published 55 high impact peer reviewed articles in International/ National Journals. She was awarded recently with the Young Scientist Research grant by from DST, Government of India and serves as editorial board member of many international journals.

Publication of speakers:

- Antara Banerjee et al ; Chemogenetic Activation of Excitatory Neurons Alters Hippocampal Neurotransmission in a Dose-Dependent Manner, 2019 Oct 23
- Antara Banerjee et al ; Concise Review on Clinical Applications of Conditioned Medium Derived from Human Umbilical Cord-Mesenchymal Stem Cells (UC-MSCs), 2018 Jul 1
- Antara Banerjee et al ; Role of the Extracellular and Intracellular Loops of Follicle-Stimulating Hormone Receptor in Its Function, 2015 Jul 17.
- Antara Banerjee et al ; Self-Assembled Surfactant Cyclic Peptide Nanostructures as Stabilizing Agents, 2014 Oct 21
- Antara Banerjee et al ; Mitochondrial Genome Analysis of Primary Open Angle Glaucoma Patients, 2013 Aug 5

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