OMICS International
conferenceseries.com

Marzena Zychowicz et al., J Tissue Sci Eng 2015, 6:2
http://dx.doi.org/10.4172/2157-7552.S1.021

4th International Conference on
Tissue Science and Regenerative Medicine
July 27-29, 2015 Rome, Italy

Reciprocal interactions between iPS-derived neural cell-seeded modified collagen scaffolds and nerve tissue

Marzena Zychowicz[1, 2], **Jose Luis Gerardo Nava**[3], **Krystyna Pietrucha**[4], **Hanna Winiarska**[1, 2], **Martyna Podobińska**[1, 2], **Gary Brook**[3] and **Leonora Bużańska**[1, 2]
[1]Polish Academy of Sciences, Poland
[2]Wroclaw Research Centre EIT, Poland
[3]RWTH Aachen University, Germany
[4]Lodz University of Technology, Poland

Induced pluripotent stem (iPS) cells are promising candidates as patient specific cell sources for transplantation or for modeling of diseases. By combining the human iPS-derived neural cells seeded on 3-D collagen scaffolds with dissociated or organotypic neural tissue we are attempting to create a biomimetic microenvironment for studying mutual interactions. To create the micro structured 3D niche, we have used type-I collagen scaffolds. Since collagen scaffolds can exhibit poor mechanical properties and rapid degradation *in vivo*, depending of cross linking, we have focused on modification of collagen physicochemical properties with improved mechanical and thermal stability without loss of its bioactivity. The human iPS cells, cultured in feeder free conditions, express markers of pluripotency (Oct, Sox2, Nanog), while after neural commitment and differentiation the cells exhibit nestin, GFAP, PDGFRα, β-tubulin III, Map-2, Dcx, GalC. The differentiated population of cells was seeded onto collagen scaffolds and co-cultured with rat organotypic spinal cord (OSC) slices or dissociated dorsal root ganglion (DRG) neurons. The collagen scaffold alone promoted neurite outgrowth from dissociated DRG neurons and when seeded with iPS-derived cells supported migration of cells from the OSC, however no migration of IPS-derived cells from the scaffold to the OSC could be detected. Such a biomimetic environment could be applied in regenerative medicine for testing directed migration from the nerve tissue into the seeded collagen scaffold.

Biography

Marzena Zychowicz, in 2012, in the Mossakowski Medical Research Centre, Polish Academy of Sciences, has accomplished her PhD in the field of neural stem cells and bioengineering surfaces. In the recent project she was interested in the standardization of the biomimetic microenvironment for the regenerative medicine application or toxicity testing. She is also involved in the project concerning mesenchymal stem cells and their application in the neurodegenerative diseases. She is co-author of 13 publications.

marzenazychowicz@gmail.com

Notes: