3D CULTURES OF PRIMARY ASTROCYTES ON POLY-L-LACTIC ACID SCAFFOLDS

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Tissue engineering is an emerging multidisciplinary field that aims at reproducing in vitro tissues with morphological and functional features similar to the biological tissue of the human body. Polymeric materials can be used in contact with biological systems in replacing destroyed tissue by transplantation [1]. Several biopolymers, including poly L (lactic acid) (PLLA), have been used in biomedical applications to set scaffolds with ductile proprieties and biodegradation kinetics [2]. In particular, the PLLA scaffold topography mimics the natural extracellular matrix and makes it a good candidate for neural tissue engineering.
We report about of 3D system the PLLA porous scaffolds prepared via thermally-induced phase separation (TIPS) [3], and utilized as substrate for primary rat astrocytes 3D growth. Interestingly astrocytes adapt well to these porous matrices, not only remaining on the surface, but also penetrating inside the scaffolds. They colonize the matrix acquiring a typical star-like morphology; they form cell contacts and, in addition produce EVs as in vivo [4]. These results suggest that the chosen conditions could be a good starting point for 3D brain culture systems. PLLA scaffolds could be further enriched to host two or three different brain cell types, in order to set an in vitro model of blood brain barrier. The future use of co-culture systems may be involved in drug delivery studies, and in the formulation of new therapeutic strategies for the treatment of neurological diseases.

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