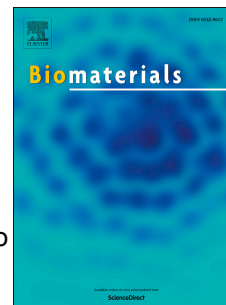


Accepted Manuscript

Microenvironments to study migration and somal translocation in cortical neurons

Shifang Zhao, Wenqiang Fan, Xiang Guo, Longjian Xue, Benedikt Berninger, Marcelo J. Salierno, Aránzazu del Campo



PII: S0142-9612(17)30774-3

DOI: [10.1016/j.biomaterials.2017.11.042](https://doi.org/10.1016/j.biomaterials.2017.11.042)

Reference: JBMT 18380

To appear in: *Biomaterials*

Received Date: 27 August 2017

Revised Date: 24 November 2017

Accepted Date: 27 November 2017

Please cite this article as: Zhao S, Fan W, Guo X, Xue L, Berninger B, Salierno MJ, del Campo Ará, Microenvironments to study migration and somal translocation in cortical neurons, *Biomaterials* (2017), doi: 10.1016/j.biomaterials.2017.11.042.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Microenvironments to study migration and somal translocation in cortical neurons

Shifang Zhao^(1,2,3), Wenqiang Fan^(4,5), Xiang Guo⁽¹⁾, Longjian Xue⁽³⁾, Benedikt Berninger^(4,5), Marcelo J. Salierno^{(3,4,5)*}, Aránzazu del Campo^{(1,2,3)*}

⁽¹⁾ INM - Leibniz Institute for New Materials, Campus D2 2, 66123 Saarbrücken, Germany.

⁽²⁾ Chemistry Department, Saarland University, 66123 Saarbrücken, Germany

⁽³⁾ Max-Planck-Institute für Polymerforschung, Ackermannweg 10, 55128 Mainz, Germany

⁽⁴⁾ Institute of Physiological Chemistry, University Medical Center of the Johannes Gutenberg University Mainz, Hanns-Dieter-Hüscher-Weg 19, 55128 Mainz, Germany

⁽⁵⁾ Focus Program Translational Neuroscience, Johannes Gutenberg University Mainz, Langenbeckstrasse 1, 55131 Mainz, Germany

*corresponding authors: aranzazu.delcampo@leibniz-inm.de, salierno@gmail.com

Abstract

Migrating post-mitotic neurons of the developing cerebral cortex undergo terminal somal translocation (ST) when they reach their final destination in the cortical plate. This process is crucial for proper cortical layering and its perturbation can lead to brain dysfunction. Here we present a reductionist biomaterials platform that faithfully supports and controls the distinct phases of terminal ST *in vitro*. We developed microenvironments with different adhesive molecules to support neuronal attachment, neurite extension, and migration in distinct manners. Efficient ST occurred when the leading process of migratory neurons crossed from low- to high-adhesive areas on a substrate, promoting spreading of the leading growth cone. Our results indicate that elementary adhesive cell-substrate interactions strongly influence migratory behavior and the final positioning of neurons during their developmental journey. This *in vitro* model allows advanced experimentation to reveal the microenvironmental requirements underlying cortical layer development and disorders.

Download English Version:

<https://daneshyari.com/en/article/6484719>

Download Persian Version:

<https://daneshyari.com/article/6484719>

[Daneshyari.com](https://daneshyari.com)