Max-Planck-Innovation

Technology Offer

A high-throughput compatible workflow for generation and analysis of homogenous human neural microtissues

File no.: MI-1012-5677-LI-ZE

Max-Planck-Innovation GmbH
Amalienstr. 33
80799 Munich
Germany

Phone: +49 (89) 29 09 19 - 0
Fax: +49 (89) 29 09 19 - 99
info@max-planck-innovation.de
www.max-planck-innovation.de

Contact:
Dr. Dieter Link
Tel.: 089 / 290919-28
Dieter.link@max-planck-innovation.de

Background

Three dimensional (3D) cell culture in the form of organ-like micro tissues ("organoids") has received increasing attention over the last 20 years. The potential of organoids to mimic cellular niches more closely than 2D cell cultures promises the advent of a new generation of high throughput screening (HTS) technologies providing superior predictions of drug efficacy and toxicity. 3D organoid-based disease models have already advanced understanding of diseases like microcephaly and ZIKA-virus pathogenesis, elucidating the dynamics of cells as they interact with tissue-specific cell types in complex cellular niches. Testing organoids instead of 2D cell cultures also has the potential to advance the understanding and therapy of human diseases such as Parkinson's, Alzheimer's and other disorders with complex interactions of several cell types in specific cellular niches.

While protocols for the generation of various types of organoids exist, these organoids remain widely incompatible with the standards for HTS. Most established strategies yield very heterogeneous organoids without predictable morphology, cellular composition, or local cellular organization. Extensive manual handling as well as matrix embedding is required prior to and during analysis, impeding industrial scale up.

Technology

Researchers from the Max-Planck-Institute of Molecular Biomedicine in Munster developed a robust method for producing and analyzing highly homogenous human neural organoids in automated workflows. Starting from tissue-specific precursor cells, resulting organoids are homogeneous in size, cellular composition, and organization. Moreover, their method does not require matrix embedding which facilitates automation while eliminating cumbersome and artefact-prone gel-micro-environments. All steps are fully implemented in automated liquid handling environments, including organoid generation, maintenance, and analysis and can be easily integrated into commercially available HTS equipment. The established protocols include automated fixation, whole-mount immunostaining, optical clearing, and high content analysis with single cell resolution. Importantly, the quality of the organoids is highly reproducible and highly predictable.

Patent Information: A European priority application has been filed in 2018.

We offer this technology on a co-exclusive basis to interested licensees.