View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Cleveland-Marshall College of Law

Cleveland State University
EngagedScholarship@CSU

Undergraduate Research Posters 2016 | Undergraduate Research Posters

2016

High-Throughput Assessment of Developmental Stages of NSCs via Promoter-Reporter Assay System Using Recombinant Lentiviruses

Emily Serbinowski
Cleveland State University

Pranav Joshi
Cleveland State University

Kyeong Nam Yu
Cleveland State University

Yana Sichkar
Cleveland State University

Follow this and additional works at: https://engagedscholarship.csuohio.edu/u_poster_2016
How does access to this work benefit you? Let us know!

Recommended Citation

Serbinowski, Emily; Joshi, Pranav; Yu, Kyeong Nam; and Sichkar, Yana, "High-Throughput Assessment of Developmental Stages of NSCs via Promoter-Reporter Assay System Using Recombinant Lentiviruses" (2016). *Undergraduate Research Posters 2016*. 45.
https://engagedscholarship.csuohio.edu/u_poster_2016/45

This Book is brought to you for free and open access by the Undergraduate Research Posters at EngagedScholarship@CSU. It has been accepted for inclusion in Undergraduate Research Posters 2016 by an authorized administrator of EngagedScholarship@CSU. For more information, please contact library.es@csuohio.edu.

MSL ACADEMIC ENDEAVORS

This digital edition was prepared by MSL Academic Endeavors, the imprint of the Michael Schwartz Library at Cleveland State University.

High-Throughput Assessment of Developmental Stages of NSCs via Promoter-Reporter Assay System Using Recombinant Lentiviruses

Washkewicz College of Engineering

Student Researchers: Emily Serbinowski, Pranav Joshi, Kyeong Nam Yu, and Yana Sichkar

Faculty Advisors: Chandra S. Kothapalli and Moo-Yeal Lee

Abstract

Many drugs and chemicals currently available have not been fully evaluated for their toxic effects on the developing brain. Expensive and low-throughput *in vivo* studies are still being used to evaluate developmental neurotoxicity (DNT). Thus, there is a need to develop an *in vitro assay* system which is economically feasible and high-throughput. Among various cellular models used for *in vitro* assay, human neural stem cells (NSCs) are highly desired due to their ability to self-renew and differentiate into neurons, astrocytes and oligodendrocytes. *In vitro* assessment of developmental stages (proliferation and differentiation) of human NSC is highly important to predict the *in vivo* effect of various chemicals on developing brain. However, conventional *in vitro* assay uses immunofluorescence staining to monitor changes in cell morphology and neural cell-specific biomarkers which can either be inaccurate or cumbersome. Therefore, we have developed an *in vitro* promoter-reporter assay system to monitor the proliferation and differentiation of NSCs using recombinant lentiviruses. Four NSC-specific biomarkers can be monitored by infecting NSCs with recombinant lentiviruses such as synapsin1 for neuron differentiation, glial fibrillary acidic protein (GFAP) for astrocyte differentiation, myelin basic protein (MBP) for oligodendrocyte differentiation, and SOX2 for self-renewal.