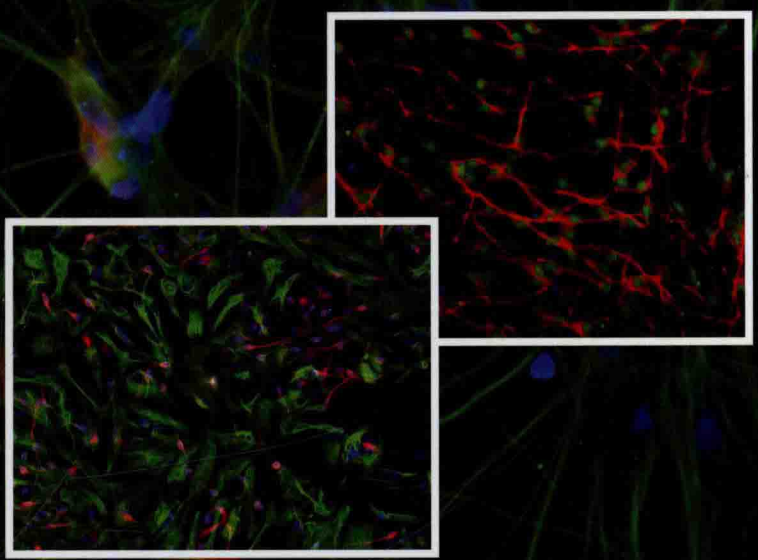
Edited by
Navjot Kaur
Mohan C. Vemuri

Neural Stem Cell Assays



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Preface

Recent advances in the field of neuroscience have enormously benefitted researchers to better understand the complexity of how brain functions, the cellular and regional heterogeneity that builds complex neural circuits and how these get disordered in disease process. The field is rapidly growing and even more so with the emergence of ways to make induced pluripotent stem cells (iPSC) an ethically derived continuously renewable population of human cells which can be converted into any type of cell in the human body. The discovery of methods to generate iPSC lines and to coax them into desired terminally differentiated cell lineages, such as brain cell types, has obviated the need to depend on rare and hard to get cells from direct primary isolates of human fetal and adult brain. Further growth in this area of research will immensely benefit brain mapping studies; facilitate the generation of a "disease-in-dish" model with co-cultures of relevant neural cell types to reflect 3D cultures with end use in drug screening and discovery models for neurodegenerative diseases. While the neuroscience research is rapidly growing, it requires well refined and optimized methods to drive inventions and innovations. Several methods and techniques are being optimized constantly and it is necessary that these protocols are made available to researchers for use in their research.

This volume of *Neural Stem Cell Assays* comprises a set of refined protocols that cover isolation of neural stem cells from mouse, rat, and human tissues; methods of expansion for different neural stem cells, cryopreservation approaches, differentiation methods to generate neural stem cells from pluripotent stem cells, and to derive terminally differentiated neural sub lineages including neurons, astrocytes and oligodendrocytes from NSCs, followed by cellular and molecular characterization methods. Some methods comprise on ways to transfer genes in neural stem cells while functional assays are carried out using transplantation assays. As editors, we have the pleasure of working with these researchers to bring this volume to a reality. We are grateful to all the authors for their commitment, time, and dedication in making these protocols available to other researchers in the field and thus advancing one more step forward in neuroscience research.

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Mohan C. Vemuri

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