

UC Irvine

UC Irvine Previously Published Works

Title

Immortalizing Neural Cells: An Overview

Permalink

<https://escholarship.org/uc/item/98m5m5gk>

Journal

Methods, 3(3)

ISSN

1058-6687

Author

Calof, Anne L

Publication Date

1993-12-01

DOI

10.1006/ncmn.1993.1051

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed

EDITORIAL

Immortalizing Neural Cells: An Overview

Our ability to make rapid progress in identifying the molecules that regulate vertebrate nervous system development and function would be greatly aided by the availability of appropriate neural cell lines. By "appropriate," I mean cell lines that exhibit the differentiated characteristics and/or developmental potential of the many different classes of cells in the nervous system. Take, for example, the wealth of information that has been gained by studying molecular regulation of neuronal differentiation in the rat pheochromocytoma cell line, PC12: Studies of this cell line have been central to our understanding of the consequences—in terms of both cell division and terminal neuronal differentiation—of growth factor action on neural cells; they have led to the discovery and functional dissection of receptors for neurotrophic factors; and they have provided information that is central to our current understanding of the cytoplasmic signaling events that regulate neuronal differentiation. As much as has been gained from studying PC12s, however, these cells cannot be used in experiments attempting to identify the molecular events that underlie the differentiation of retinal neurons, or the development of oligodendrocytes, or the regulation of odorant receptor expression. For studying these processes, what we would really like would be cell lines representative of particular neural cell types, at specific stages in development.

There is, I believe, reason to be cautiously optimistic that such cell lines can be made. It is the aim of this issue of *NeuroProtocols* to introduce to the reader interested in trying to immortalize neural cells something of the range of approaches (and the disadvantages as well as the advantages of these approaches) available for making neural cell lines. Particularly for those interested in immortalizing murine (rat and mouse) neural cells, there are now a number of different approaches that can be taken. Three of these—production of transgenic animals carrying targeted or inducible oncogenes, infection of dividing precursor cells with oncogene-containing retroviruses, and fusion of primary neurons with neuroblastoma cell lines—form the focus of articles in this issue. All three of these approaches have been successful in producing immortalized neural cell lines, some of which possess highly differentiated neuronal properties. Furthermore, investigators have also been developing approaches for making neural cell lines from two systems of particular interest to developmental neurobiologists: *Xenopus laevis* and the avian embryo. Two groups share their expertise in this area in articles in this issue. Approaches that may prove to be important in assessing the developmental potential of immortalized neural cells are also covered; one article deals specifically with grafting cells into the rodent central nervous system. It is our hope that publication of this issue of *NeuroProtocols* will be useful in helping other researchers to develop and evaluate the cell lines they require.

I am grateful to all the contributors to this issue for taking part in this effort and for their enthusiasm and generosity in providing detailed discussions of their work in this still-embryonic area of neurobiological research.

Anne L. Calof
Guest Editor