Induction of neural stem cell-like cells (NSCLCs) from mouse astrocytes by Bmi1

Jai-Hee Moon, Byung Sun Yoon, Bona Kim, Gyuman Park, Hye-Youn Jung, Isaac Maeng, Eun Kyong Jun, Seung Jun Yoo, Aeree Kim, Sejong Oh, Kwang Youn Whang, Hyunggee Kim, Dong-Wook Kim, Ki Dong Kim and Seungkwon You

Laboratory of Cell Growth and Function Regulation, College of Life Sciences and Biotechnology, Korea University, 5-1, Anam-Dong, Sungbuk-ku, Seoul 136-701, Republic of Korea

Imgen Co., Ltd, Suwon, Gyenggi-Do, Republic of Korea

Department of Dermatology, College of Medicine, Korea University, Seoul, Republic of Korea

Department of Pathology, College of Medicine, Korea University, Seoul, Republic of Korea

Department of Animal Science, Institute of Agricultural Science & Technology, Chonnam National University, Gwangju, Republic of Korea

Department of Physiology, Center for Cell Therapy, Yonsei University College of Medicine, Seoul, Republic of Korea


Abstract

Recently, Bmi1 was shown to control the proliferation and self-renewal of neural stem cells (NSCs). In this study, we demonstrated the induction of NSC-like cells (NSCLCs) from mouse astrocytes by Bmi1 under NSC culture conditions. These NSCLCs exhibited the morphology and growth properties of NSCs, and expressed NSC marker genes, including nestin, CD133, and Sox2. In vitro differentiation of NSCLCs resulted in differentiated cell populations containing astrocytes, neurons, and...
oligodendrocytes. Following treatment with histone deacetylase inhibitors (trichostatin A and valproic acid), the potential of NSCLCs for proliferation, dedifferentiation, and self-renewal was significantly inhibited. Our data indicate that multipotent NSCLCs can be generated directly from astrocytes by the addition of Bmi1.

**Keywords:** Neural stem cells; Astrocytes; Dedifferentiation; Neural stem cell-like cells

**Article Outline**

Materials and methods

Results

Bmi1 stimulates the growth of mouse astrocyte by suppressing p16<sup> Ink4a </sup> and p19<sup>Arf </sup> pathways

Bmi1 induces the dedifferentiation of astrocytes into neural stem cell-like cells under neural stem cell culture conditions

NSCLCs differentiate into three neural lineages in vitro

Discussion

Acknowledgements

Appendix A. Supplementary data

References

**Note to users:** The section "Articles in Press" contains peer reviewed accepted articles to be published in this journal. When the final article is assigned to an issue of the journal, the "Article in Press" version will be removed from this section and will appear in the associated published journal issue. The date it was first made available online will be carried over. Please be aware that although "Articles in Press" do not have all bibliographic details available yet, they can already be cited using the year of online publication and the DOI as follows: Author(s), Article Title, Journal (Year), DOI. Please consult the journal's reference style for the exact appearance of these elements, abbreviation of journal names and the use of punctuation.

There are three types of "Articles in Press":

- Accepted manuscripts: these are articles that have been peer reviewed and accepted for publication by the Editorial Board. The articles have not yet been copy edited and/or formatted in the journal house style.
- Uncorrected proofs: these are copy edited and formatted articles that are not yet finalized and that will be corrected by the authors. Therefore the text could change before final publication.
- Corrected proofs: these are articles containing the authors’ corrections and may, or may not yet have specific issue and page numbers assigned.