School of Life Sciences

# Seminar Series

No. 2019-27

Wed., **20 November**, 4:00pm

Jukhyun Bio Auditorium(RM.121)

English

## Role of cell cycle dependent kinase inhibitors to stimulate neural and glial differentiations in the developing brain


Speaker | Yoichi Kosodo

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Host | Prof. Mi-Ryoung Song

광주과학기술원 생명과학부

Gwangju Institute of Science and Technology School of Life Sciences

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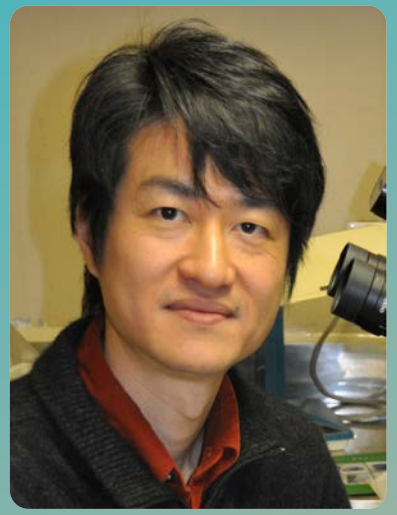

Yoichi Kosodo, Ph.D.

## Education/Experience

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|---|---|
| **1991.04-1996.03** | B.Sc. in Engineering, Dept. of Chemistry and Biotechnology, University of Tokyo |
| **1996.04-1998.03** | M.Sc. in Life Sciences, Dept. of Biotechnology, University of Tokyo |
| **1998.04-2001.03** | Ph.D. in Life Sciences, Laboratory of Koji Yoda, Dept. of Biotechnology, University of Tokyo |
| **2001.07-2010.08** | Postdoctoral Fellow, Lab. of Wieland B. Huttner, Max-Planck-Institute of Molecular Cell Biology and Genetics (MPI-CBG), Dresden, Germany |
| **2005.09-2010.08** | Research Scientist, Lab. for Cell Asymmetry, RIKEN Center for Developmental Biology, Kobe, Japan |
| **2010.09-2015.03** | Associate Professor, Department of Anatomy, Kawasaki Medical School, Kurashiki, Japan |
| **2015.04-present** | Lab Head, Korea Brain Research Institute, Daegu, South Korea |

## Abstract

Astrocyte is a type of glia that plays a wide role in maintaining CNS. In spite of several efforts, the mechanism of astrocyte differentiation is largely unclear. Here, I present our recent findings that Cyclin Dependent Kinase Inhibitor (CDKI), which controls CDK4/6 during G1 phase, can trigger the differentiation of astrocyte in the developing cortex. In general, cell cycle exit precedes differentiation, and the length of G1 is one of the crucial factors to regulate the balance between proliferation and differentiation. By observing the expression pattern of astrocyte-specific marker, Aldh1l1, in various embryonic stages of Aldh1l1-EGFP mice, we found that EGFP in the ventricular zone was gradually increased from E15. Notably, expression level of CDKIs was accompanied in the same manner. We further examined whether CDKIs can regulate the generation of astrocyte in both in vitro and in vivo. When the CDKI genes were overexpressed in embryonic brain of Aldh1l1-EGFP mice as well as cultured cell with various conditions, EGFP+ cells were increased. We further confirmed that, with markers of astrocyte and cortical neurons, CDKI-overexpressed cells tend to differentiate into astrocyte rather than upper layer neuron depending on the stages of CDKI introduction. Furthermore, CDKI-overexpressed cells showed morphological characteristics of astrocyte. Taken together, CDKI can potentiate astrocyte production in a stage dependent manner, which can be considered as the novel effect of cell-cycle inhibition towards the astrocyte differentiation.