

【Grant-in-Aid for Young Scientists(S)】

Integrated Science and Innovative Science (Comprehensive fields)



Title of Project : Mechanisms of adult neurogenesis

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Research Area : Comprehensive fields

Keyword : Molecular and cellular neurobiology

【Purpose and Background of the Research】

The production of new neurons continues in the subventricular zone (SVZ) in the adult brain (Fig. 1). New neurons generated in the SVZ migrate towards the olfactory bulb (OB), where they differentiate into mature neurons. In this project, we will study mechanisms regulating the cell migration and the cell turnover in the OB.

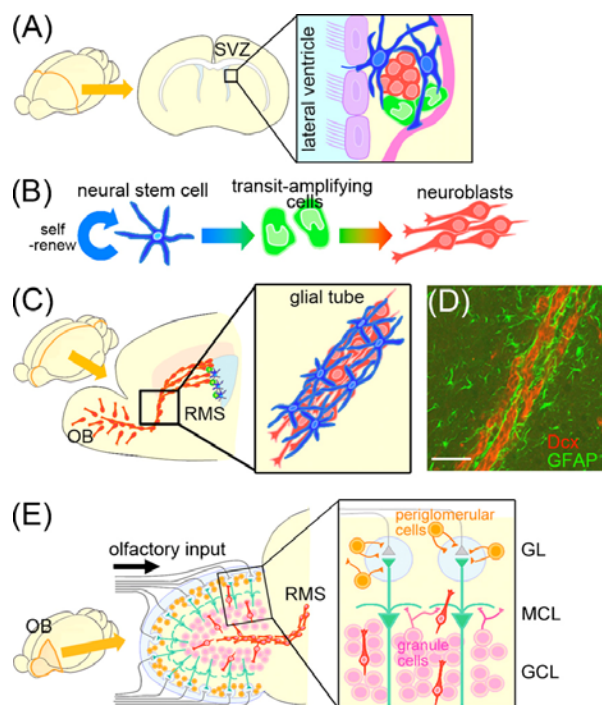


Figure 1. Neurogenesis in the adult mouse subventricular zone (SVZ). (A) Location and structure of the SVZ. (B) Production of neurons in the SVZ. (C) Migration of neuroblasts from the SVZ to the olfactory bulb (OB). (D) Immunohistochemistry of migrating DCX-positive neuroblasts and GFAP-positive astrocytes in the rostral migratory stream (RMS). (E) Neurogenesis in the OB. GCL, granule cell layer; MCL, mitral cell layer, GL, glomerular layer. (Kaneko and Sawamoto, *Neurosci. Res.* 63: 155-164, 2009)

【Research Methods】

We will combine various in vitro and in vivo approaches, which include protein chemistry, chemical library screening, immunohistochemistry, electron microscopy, tissue culture, gene trap screening, and in vivo imaging with two-photon excitation microscopy. In addition to mice, we will use zebrafishes to identify novel molecules involved in adult neurogenesis. We will also study mechanisms of neurogenesis in the adult common marmoset monkeys.

【Expected Research Achievements and Scientific Significance】

Through this research project, we expect to identify and understand mechanisms of adult neurogenesis. In addition, the results may provide a scientific basis for brain regeneration therapies without using cell transplantation.

【Publications Relevant to the Project】

- Kaneko, N. and Sawamoto, K.
Adult neurogenesis and its alteration under pathological conditions.
Neurosci. Res. 63: 155-164, 2009.
- Yamashita, T., Ninomiya, Y. et al.
Subventricular zone-derived neuroblasts migrate and differentiate into mature neurons in the post-stroke adult striatum.
J. Neurosci. 26, 6627-6636, 2006.
- Sawamoto, K. et al.
New neurons follow the flow of cerebrospinal fluid in the adult brain.
Science 311: 629-632, 2006.

【Term of Project】 FY2009-2013

【Budget Allocation】 80,200 Thousand Yen

【Homepage Address and Other Contact Information】

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