

# ウイルス・再生医科学研究所 幹細胞デコンストラクション分野 (今吉 研究室)



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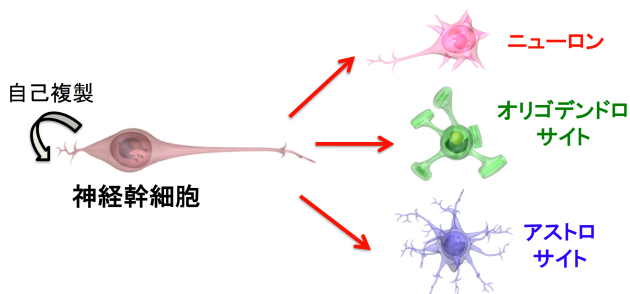
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<https://brainnetworks.jimdofree.com>

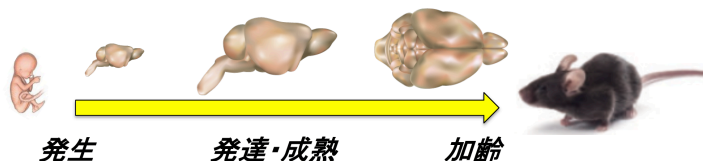
## 研究内容

複雑かつ精緻な哺乳類の脳神経系は、遺伝的プログラムに従い再現性良く発生・発達します。一方で、生後発達過程や成体においても、哺乳類の脳は柔軟な可塑的性質を持っています。そして、これらの二つの性質が相まって、動物の行動や高次脳機能を制御する脳神経系が出来上がり、維持されます。このような脳神経系の発生・発達・可塑性について研究を行っています。特に、神経幹細胞の制御機構とニューロン新生という現象に着目しており、分子遺伝学・光遺伝学やライブイメージングという技術を駆使して、研究を進めています。

## 神経幹細胞の細胞分化



## 脳の発生・発達・成熟



## 主要な研究成果

1: Yamada, M., Nagasaki, C.S., Suzuki, Y., Hirano, Y. and **Imayoshi, I.** (2020) Optimization of light-inducible Gal4/UAS gene expression system in mammalian cells. *iScience*, 23, 101506.

2: **Imayoshi, I.**, Tabuchi, S., Matsumoto, M., Kitano, S., Miyachi, H., \*Kageyama, R. and Yamanaka, A. (2020) Light-induced silencing of neural activity in Rosa26 knock-in and BAC transgenic mice conditionally expressing the microbial halorhodopsin eNpHR3. *Sci Rep.*, 10(1):3191.

3: Sueda, R., **Imayoshi, I.** (co-first author), Harima, Y., and \*Kageyama, R. (2019) High Hes1 expression and resultant Ascl1 suppression regulate quiescent versus active neural stem cells in the adult mouse brain. *Genes Dev.*, 33, 511-523.

4: Yamada, M., Suzuki, Y., Nagasaki, S., Okuno, H. and **Imayoshi, I.** (2018) Light-inducible Tet-gene expression system in mammalian cells. *Cell Reports*, 25, 487-500.

5: Li, W.L., Chu, M.W., Wu, A., Suzuki, Y., **Imayoshi, I.** and \*Komyiyama, T. (2018) Adult-born neurons facilitate olfactory bulb pattern separation during task engagement. *eLife* 7, e33006.

6: Sakamoto, M., Ieki, N., Miyoshi, G., Mochimaru, D., Miyachi, H., Imura, T., Yamaguchi, M., Fishell, G., Mori, K., Kageyama, R. and **Imayoshi, I.** (2014) Continuous postnatal neurogenesis contributes to formation of the olfactory bulb neural circuits and flexible olfactory associative learning. *The Journal of Neuroscience*, 34: 5788-5799.

7: **Imayoshi, I.** and Kageyama, R.\* (2014) bHLH Factors in Self-Renewal, Multipotency, and Fate Choice of Neural Progenitor Cells. *Neuron*, 82: 9-23.

8: **Imayoshi, I.**, Isomura, A. (equal contribution), Harima, Y., Kawaguchi, K., Kori, H., Miyachi, H., Fujiwara, T.K., Ishidate, F. and \*Kageyama, R. (2013) Oscillatory control of determination factors for multipotency versus fate choice in mouse neural progenitors. *Science* (Research Article) 342:1203-1208.

9: **Imayoshi, I.**, Sakamoto, M., Yamaguchi, M., Mori, K. and \*Kageyama, R. (2010) Essential roles of Notch signaling in maintenance of neural stem cells in the developing and adult brains. *The Journal of Neuroscience*, 30: 3489-3498.

10: **Imayoshi, I.**, Sakamoto, M., Ohtsuka, T., Takao, K., Miyakawa, T., Yamaguchi, M., Mori, K., Ikeda, T., Itohara, S. and \*Kageyama, R. (2008) Roles of continuous neurogenesis in the structural and functional integrity of the adult forebrain. *Nature Neuroscience*, 11: 1153-1161.