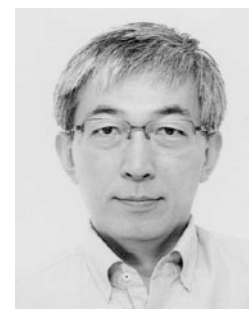


Molecular Neurobiology

Principal Investigator Masayuki Masu

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Other Faculty Members

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Major Scientific Interests of the Group

Our main research focus is to study the molecular mechanisms that regulate the neural circuit formation and higher brain functions. Using integrative approaches including molecular biology, biochemistry, pharmacology, developmental biology, and neuroanatomy, we have been investigating how complex networks are formed in the developing brain and how the mature brain functions are acquired and regulated. We are particularly interested in the molecules that play a role in neural differentiation, cell migration, axon guidance, and synaptogenesis.

Projects for Regular Students in Doctoral or Master's Programs

- 1) Molecular study on neural differentiation
- 2) Molecular study on axon guidance
- 3) Molecular study on brain function

Study Programs for Short Stay Students (one week – one trimester)

- 1) Immunohistochemistry, in situ hybridization, and microscopy
- 2) Tracing of neural circuits
- 3) 3D imaging of neural network
- 4) Optogenetic and chemogenetic manipulation of neural functions

Selected Publications

- 1) Takahasi A et al. Lateral habenula glutamatergic neurons projecting to the dorsal raphe nucleus promote aggressive arousal in mice. **Nat. Commun.** 13, 4039, 2022.
- 2) Miya K et al. Expression of heparan sulfate endosulfatases in the adult mouse brain: Co-expression of Sulf1 and dopamine D1/D2 receptors. **Front. Neuroanat.** 15, 726718, 2021.
- 3) Aizawa S et al. Abnormal pyramidal decussation and bilateral projection of the corticospinal tract axons in mice lacking the heparan sulfate endosulfatases, Sulf1 and Sulf2. **Front. Mol. Neurosci.** 12, 333, 2020.
- 4) Okada T et al. Desulfation of heparan sulfate by Sulf1 and Sulf2 is required for corticospinal tract formation. **Sci. Rep.** 7, 13847, 2017.
- 5) Masu M. Proteoglycans and axon guidance: a new relationship between old partners. **J. Neurochem.** 139, 58-75, 2016.
- 6) Nagamine S et al. Organ-specific sulfation patterns of heparan sulfate generated by extracellular sulfatases Sulf1 and Sulf2 in mice. **J. Biol. Chem.** 287, 9579-9590, 2012.
- 7) Keino-Masu K, Masu M, et al. *Deleted in Colorectal Cancer (DCC)* encodes a netrin receptor. **Cell** 87, 175-185, 1996.