# Neurochemistry & Molecular Cell Biology

Prof Michihiro Igarashi, MD/PhD

Studies of our laboratory are engaged in those of the mechanisms of nerve growth and axon regeneration from the molecular aspects. As mentioned later, we utilize the proteomic and the phosphoproteomic approaches to focus the target proteins and find the molecular specific interactions, and observe their dynamics using superresolution microscopy and analyzed by the real-time imaging. In addition, we are investigating the molecular significance of chondroitin sulfate (CS) in the neural plasticity and the neurological diseases.

## Research Interests

1. Molecular mechanisms of the nerve growth using proteomics
2. Superresolution analysis of the growth cone behaviors
3. Biological significance of CS in the brain

## Materials and Methods

1. Phosphoproteomics: for the signaling of mammalian growth cones
2. Superresolution microscopy: structured-illumination microscopy (SIM) for live-imaging of the growth cone behavior
3. Knockout mice of CSGalNAcT1 (a rate-limiting enzyme of the CS synthesis)
4. Primary culture of the neurons from the developing brain

## Links to the additional information

1. Igarashi M: Molecular basis of the functions of the mammalian neuronal growth cone revealed using new methods. Proc Jpn Acad Ser B Phys Biol Sci. 2019; 95(7):358-377 https://www.jstage.jst.go.jp/article/pjab/95/7/95_PJA9507B-05/_article
2. Igarashi M, Nozumi M, Wu LG, Cella Zanacchi F, Katona I, Barna L, Xu P, Zhang M, Xue F, Boyden E. New observations in neuroscience using superresolution microscopy. J Neurosci. 2018;38(44):9459-9467. https://www.jneurosci.org/content/38/44/9459.long
3. Igarashi M, Takeuchi K, Sugiyama S: Roles of CSGalNAcT1, a key enzyme in regulation of CS synthesis, in neuronal regeneration and plasticity. Neurochem Int. 2018 119:77-83. https://www.sciencedirect.com/science/article/abs/pii/S019701861730356X?via%3Dihub
4. HP of the laboratory: https://www.med.niigata-u.ac.jp/bc2/achievement/index.html