Lecture 4: December 15th 10 am

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Education and Training

2002 B.S., Biochemistry, University of Tokyo
2007 Ph.D., Neuroscience, University of Tokyo
2009 Postdoctorial, Neuroscience, University of California, San Diego
2014 Postdoctorial, Neuroscience, Columbia University

Selected Awards and Honors

2007 Student of the Year Award (Graduate School of Frontier Sciences, University of Tokyo)
2007 Best Thesis Award (The University of Tokyo)
2008 Inoue Research Award for Young Scientist (Inoue Foundation)
2015 Searle Scholar (Searle Scholars Program)
2015 Mallinckrodt Grant Scholar (Mallinckrodt Foundation)
2015 The Okawa Foundation Research Grant Awardee (Okawa Foundation)

"Molecular and cell-type dissection underlying sodium homeostasis"

Regulation of any given behavior involves multiple brain circuits, but defining the role of each circuit is challenging. We address this fundamental neuroscience question using sodium appetite circuit as an ideal model platform due to its unique anatomical and functional organization. Just like water and energy hemostasis, sodium balance is critical for many biological functions such as osmoregulation and synaptic transmission. Excessive sodium intake is a risk factor of vascular and cognitive dysfunction. When sodium is depleted in the body, the brain triggers signals to elevates the hedonic value of sodium salts and drives robust sodium consumption. Notably, sodium-depleted animals crave high concentrations of salt that are strongly aversive under sated conditions. Thus, achieving appropriate sodium consumption requires the brain to control both attractive and aversive signals toward sodium depending on internal state.

Our group recently reported that specific neural population in the hindbrain area, pre-locus coeruleus (pre-LC), regulate sodium ingestion. However, it is currently unknown how this appetite signal is processed in the whole brain to drive ingestive behavior. I will describe a transcriptomic tool to identify specific cell type in downstream areas of a given neural population. Using this tool, we aim to dissect the brain-wide functionally defined sodium appetite circuits.