Tohoku-NYCU Online Seminar

Organized by :
Tohoku University, Graduate School of Medicine,
National Yang Ming Chiao Tung University, College of Medicine
Endorsed by :
Tohoku University [Neuro Global International Joint Graduate program,
Tohoku University Brain Science Center

Date

Wednesday, August 5, 2026, 17:00 – 18:35 JST
(16:00 – 17:35TST)

1st Speaker

Shih-Pin Chen (陳世彬), MD, PhD.

Professor & Director, Institute of Clinical Medicine,
National Yang Ming Chiao Tung University
Chief, Division of Translational Research, Department of Medical Research, Taipei Veterans General Hospital

Title

The role of neuroinflammation in migraine

2nd Speaker

Hiromu Tanimoto, PhD.

Professor, Tohoku University Graduate School of Life Sciences

Title

Activity-dependent synthesis of translational machinery through dynamic remodeling of ribonucleoprotein granules

Format ONLINE

Program

17:00 JST (16:00 TST) Opening Remarks (10mim)
17:10 (16:10) Lecture by**, Shih-Pin Chen, MD, PhD.** (35min)
17:45 (16:45) Q&A (5min)
17:50 (16:50) Lecture by, **Hiromu Tanimoto, PhD.** (35min)
18:25 (17:25) Q&A (5min)
18:30 (17:30) Closing Remarks (5min)

Contact: Prof. Ken-Ichiro Tsutsui
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Speaker ：Shih-Pin Chen, MD, PhD.

Title: The role of neuroinflammation in migraine

Abstract:

Migraine is a complex neurological disorder with substantial socioeconomic impact. Despite advances in the field, its pathophysiology is still incompletely understood. Recent advances in clinical and preclinical studies suggest a potential role of neuroinflammation in migraine pathogenesis. Cortical spreading depolarization (CSD), the electrophysiological substrate of migraine aura, is the only established intrinsic brain event capable of triggering trigeminovascular activation. Our work previously demonstrated that activation of the neuronal P2X7–Panx1–NLRP3 inflammasome pathway is a critical driver of CSD-induced neuroinflammatory cascades and trigeminovascular activation. We recently found that CSD elicits dysfunction of the glymphatic and meningeal lymphatic systems, which delays the removal of inflammatory mediators, thereby sustaining neuroinflammation and pain. Together, these findings identify a mechanistic link between cortical neuroinflammation, dysfunctional glymphatic–meningeal lymphatic transport, and trigeminovascular activation in migraine.

Reference:

1. Chen PY, Yen JC, Liu TT, Chen ST, Wang SJ, **Chen SP***. Neuronal NLRP3 inflammasome mediates spreading depolarization-evoked trigeminovascular activation. ***Brain*** 2023 July; 146(7): 2989–3002
2. Wu CH, Chang FC, Wang YF, Lirng JF, Wu HM, Pan LLP, Wang SJ*, **Chen SP*** Impaired glymphatic and meningeal lymphatic functions in patients with chronic migraine. ***Annals of Neurology*** 2024 Jan;95:583–595
3. Wu CH*, Fushimi Y, Wang YF, Lin TM, Ling YH, Tai WA, Wu HM, Chang FC, Lirng JF, Wang SJ, **Chen SP***. Mapping human glymphatic compartments and putative meningeal border pathways in diseased models. ***Brain*** 2026 Jun 9:awag203. doi: 10.1093/brain/awag203.

Profile:

Dr. Chen is currently the Director of Institute of Clinical Medicine, National Yang Ming Chiao Tung University and the Chief in Division of Translational Research, Department of Medical Research, Taipei Veterans General Hospital. Dr. Chen is dedicated to unraveling the pathophysiology of headache and neurovascular disorders using bidirectional translational approach encompassing clinical, neuroimaging, genetics, and preclinical animal studies. He has authored over 180 research articles, including those from esteemed journals such as JAMA Neurology, Brain, Annals of Neurology, and Neurology, etc. .

Speaker ：Hiromu Tanimoto, PhD

Title: Activity-dependent synthesis of translational machinery through dynamic remodeling of ribonucleoprotein granules

Abstract:

Neuronal stimulation drives gene-expression programs supporting long-lasting changes, yet how depolarization reshapes post-transcriptional regulation remains poorly understood. Here, we combined optogenetic stimulation with neuron-specific Ribo-seq and RNA-seq in the Drosophila brain to resolve activity-evoked translational dynamics. Stimulation triggered two temporally ordered programs: a rapid wave to translate synapse remodeling factors and neuropeptides, followed by a dominant delayed program that selectively upregulated translation of protein synthesis machinery, including nearly all cytosolic ribosomal proteins (RPs). Transcripts in the late program are marked by 5' terminal oligopyrimidine (TOP) motifs. TOP mRNAs accumulated in ribonucleoprotein granules at the basal state but are released upon stimulation. We identified La-related protein as a key regulator of the activity-dependent translation of TOP mRNA and memory consolidation. Comparative genomics indicated that TOP enrichment in RP mRNAs is specific to metazoans. These findings suggest that animals acquired activity-dependent TOP-mRNA control to couple neuronal stimulation with adaptation of translational capacity.

Reference:

1. Ichinose T*, Kondo S, Kanno M, Shichino Y, Mito M, Iwasaki S, **Tanimoto H***. Translational regulation enhances distinction of cell types in the nervous system. ***eLife*** 2024 12:RP90713. う 7

Profile:

Dr. Tanimoto is Professor at the Graduate School of Life Sciences, Tohoku University, Japan. His research centers on elucidating the neuronal mechanisms of memory formation using Drosophila as a model system. Over several decades, his laboratory has established and applied a broad suite of genetic tools to dissect mushroom body circuits, providing key insights into their organization and function at synaptic resolution. Building on these findings, his research program has expanded to address fundamental questions regarding the evolutionary origins of neuronal control of feeding behavior. By integrating comparative approaches, including studies in jellyfish, his team seeks to identify ancestral features of nervous systems and basal principles of neuromodulation.

Dr. Tanimoto received his PhD from the University of Tokyo, Japan. He subsequently conducted postdoctoral research and served as a principal investigator in Germany at the University of Würzburg and the Max Planck Institute of Neurobiology. His work bridges molecular, synapse, circuit, behavioral and evolutionary neuroscience, contributing to a comprehensive understanding of adaptive behavior.