ASHBi SEMINAR

Towards Human Systems Biology of Sleep/Wake Cycle: The roles of Calcium and Phosphorylation Hypothesis of Sleep

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Date Wednesday, 5 June 2024

Time 16:00 – 17:00 [JST]

Venue Conference Room Onsite Only*

B1F, Faculty of Medicine Bldg. B

*Register via the right QR code

Abstract

The field of human biology confronts three major technological hurdles: the causation problem, complexity problem, and heterogeneity problem. To overcome these challenges, we've developed innovative approaches:

Mammalian next-generation genetics: Triple CRISPR for knockout (KO) mice and ES mice for knock-in (KI) mice enable causation studies without traditional breeding methods.

Whole-body/brain cell profiling techniques: CUBIC allows comprehensive cell atlas construction to unravel cellular composition complexity.

Accurate and user-friendly technologies for measuring sleep and awake states: ACCEL facilitates real-world monitoring of fundamental brain states, addressing human heterogeneity.

Integration of these technologies has led to significant progress in sleep research, particularly in understanding sleep regulation mechanisms and sleep functions. We've proposed the phosphorylation hypothesis of sleep, emphasizing the role of CaMKIIα/CaMKIIβ and calcium signaling pathways in inducing and sustaining sleep.

During the talk, we'll discuss our findings on muscarinic acetylcholine receptors (Chrm1 and Chrm3) as essential genes for REM sleep and their implications for psychiatric, neurodevelopmental, and neurodegenerative disorders. We will discuss new insights into psychiatric disorders, neurodevelopmental disorders, and neurodegenerative disorders derived from the phosphorylation hypothesis of sleep.

References:

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