

Srikanta Chowdhury

Department of Medicine, Columbia University

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14:00-15:00

1F Auditorium, DB Building C, Kobe / Broadcast online via Zoom

✂This seminar is open only for BDR Members

From Satiety to Sleep

Summary

Animals continuously transition between behavioral states, such as starting or stopping a meal or sleep episode, in response to internal physiological signals. While the molecules and hormones involved have been extensively studied, the neural mechanisms that integrate peripheral information and transform it into adaptive behavioral decisions remain poorly understood. In this talk, I will present a framework for understanding feeding and sleep as state transitions governed by specialized brain-body circuits that encode internal signals over time. Beginning with feeding, I will describe recent work that identifies a population of cholecystokinin (CCK)-expressing neurons in the dorsal raphe nucleus that function as a higher-order meal-termination system. These neurons process bite-by-bite sensory information, gastric distension, and gut-derived hormonal signals, yet they exert their behavioral effects with a delay of tens of minutes. This timing allows CCK neurons to control meal size without causing aversion or reducing hunger, reframing satiation as an evidence-accumulation process rather than a reflex. These findings provide a neural mechanism linking peripheral nutrient signals to decision-making during feeding. I will then expand this framework to sleep, highlighting work showing that inhibitory neurons in the ventral tegmental area promote non-REM sleep by directly suppressing lateral hypothalamic orexin neurons. These results suggest that sleep, like feeding, is actively gated by neural circuits that regulate behavioral state transitions, rather than simply reflecting fatigue or energy depletion. Overall, this work illustrates shared principles through which the nervous system manages internal states to influence behavior.