NEURO GLOBAL Seminar

Date & Time

Thursday, April 16, 2026
13:30 – 15:00

Speaker

Jerome Sanes, Ph.D.

Professor, Department of Neuroscience and
Carney Institute for Brain Science,
Brown University

Title

Brain mechanisms of cognitive flexibility in health and brain disorders

Venue

Auditorium, School of Medicine Building 6 (Megabank) , 1 F/ Seiryo Campus
医学部６号館 (メガバンク)1階 講堂 星陵キャンパス 【B08】
【MAP】 https://www.tohoku.ac.jp/map/en/?f=SR_B08

Format On-site ONLY

Related website https://vivo.brown.edu/display/jsanes

●Neuro Globalプログラム生 (Neuro Global Program Students)
【脳科学セミナーシリーズEx】/【先進脳科学セミナーシリーズEx】セミナー 1ポイント
【Brain Science Seminar Series Ex】/【Advanced brain science seminar series Ex】 1 point
●医学系研究科(Graduate School of Medicine)
【医学履修課程】国際交流セミナー (アドバンスド講義科目)」 出席1回分
【Medical Science Doctoral Course】 International Interchange Seminar (Advanced Lecture course) 1 attendance
●生命科学研究科(Graduate School of Life Sciences)
【単位認定セミナー】 【イノベーションセミナー（留学生対象）】 2ポイント
【Credit-granted seminar】 【Innovation seminar (For international students)】 2 points

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NEURO GLOBAL
Seminar

Title
Brain mechanisms of cognitive flexibility in health and brain disorders

Abstract
Humans and other vertebrates often update or revise initial decisions, a “change-of-mind” (CoM), even without any new sensory information, which likely represents a key aspect of cognitive flexibility. Despite its prevalence and importance, the neural substrate(s) and mechanisms of CoM in humans remain poorly understood in both health and brain disorders. Based on prior results, we reasoned that frontal and parietal neocortical regions would have key roles related to changes in initial decisions. We collected behavioral and functional MRI (fMRI) data during a reaching task in which participants moved in the direction of perceived apparent motion of a random-dot-motion (RDM) pattern. As expected, performance improved with more coherent RDM patterns, which we turned off as soon as movement started, thus eliminating new sensory evidence. We also observed up to 40% CoM events, with more CoM events for lower coherent RDM patterns. In neurotypical adults, we identified several brain regions, including the right precuneus, superior frontal gyrus, supramarginal gyrus (SMG), angular gyrus, left supplementary motor area (SMA), and bilateral middle frontal cortex, that exhibited more activation during CoM events compared to non-CoM events. Activation in many of these areas was correlated with incidence of CoM events, the time that participants reversed their initial decision, or confidence about the decision. A region in the right SMG exhibited a complex relationship between CoM incidence and local processing, such that the effect of right SMG intrinsic neural processing on CoM incidence was mediated by the strength of right SMG activation. In a separate experiment, patients with obsessive compulsive disorder (OCD), as predicted, exhibited fewer CoM events, consistent with their known cognitive inflexibility. OCD patients showed reduced activation, compared to healthy controls, during CoM events in the inferior frontal gyrus and the subgenual cingulate cortex, regions previously implicated in OCD. Taken together, these observations suggest a specific role for frontal and parietal regions in cognitive flexibility and suggest that intrinsic neural processing mediates this observed behavior

Speaker information:
Jerome Sanes is a professor of neuroscience and an affiliate member of the Robert J. and Nancy Carney Institute of Brain Science at Brown University. He also holds a research scientist position at the Center for Neurorestoration and Neurotechnology at the Providence Veterans Administration Healthcare System, U.S. Department of Veterans Affairs. He currently studies brain mechanisms of voluntary movement, motor learning, cognitive flexibility, and non-image forming vision using neuroimaging, neurophysiology, and behavioral methods in healthy adults and individuals with brain disorders.]While advancing the field’s understanding of the basic neurobiology of voluntary movement and learning, and cognitive flexibility, and non-image forming vision , his work also relates to developing technology based rehabilitative strategies for patients with brain disorders.

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