ASHBi SEMINAR

2023
04.07 FRI
17:00-18:00

Venue **Seminar Room** Onsite Only
1F, Faculty of Medicine Bldg. B

Lecturer **Mark Eldridge** Ph.D.
Postdoctoral Fellow, NIH

Barry Richmond M.D., Ph.D.
Chief, Section on Neural Coding and Computation (SNCC), NIH

*Register via the right QR code

"Studying cortico-cortical and cortico-striatal circuits with molecular genetic tools"

Lecturer: **Mark Eldridge** Ph.D.

The translation of chemogenetic technology from rodents to nonhuman primates (NHP) has created the opportunity to study questions of systems neuroscience in unprecedented detail. We have used the inhibitory chemogenetic receptor, hM4Di, to map a circuit critical for choice, in the context of learned stimulus-reward associations. Necessary components of the pathway include the rhinal cortex, orbitofrontal cortex, and the caudate nucleus. We have also used chemogenetic technology targeted to unilateral caudate nucleus to produce an NHP model of motor impulsivity. Finally, we have begun to validate techniques for cell-type specific modulation using enhancer sequences, retrograde transduction, and non-chemogenetic techniques such as CRISPRi, to further expand and refine the toolbox of molecular tools for systems neuroscience.

"Image representation in the primate ventral visual stream"

Lecturer: **Barry Richmond** M.D., Ph.D.

It is widely accepted that a set of interconnected cortical brain regions running from the occipital pole to the ventral temporal lobe underlie the ability to behave based on the form or identity of visual images.This pathway, labeled as the 'ventral visual stream', consists of architectonic areas starting with primary visual cortex (V1) in the occipital lobe through V2, to V4, to the inferior temporal cortex areas TEO and TE. Even though it is well-known that there are reciprocal anatomical connections between areas in the ventral visual stream, this system is often modeled as a multi-layer, feed-forward network (a deep network), with the nodes in each layer having 'receptive fields' inspired by the selectivity reported from neurophysiological recordings.We used two behavioral tasks, a pattern discrimination task and a pattern recognition task to study visual image analysis in the ventral stream. In the pattern discrimination task the monkeys had to judge whether a morphed image was more dog-like or cat-like. Bilateral removals of either area TEO or area TE led to a modest impairment, and when both TEO and TE were removed, the deficit was severe. Thus, each of the two regions contributed to the discrimination. Further, this suggests that visual information gets to TE even when TEO has been removed. The same monkeys were tested in a 'running recognition' task in which the monkeys are presented with a series of images, each appearing exactly twice in the series. The monkeys had to indicate whether they had seen the presented image before or not. TEO rermoval had no effect on performance whereas TE removal caused a severe impairment. This finding adds further evidence that TE receives high resolution visual information (information detailed enough to support running recognition over hundreds of trials) independent of TEO.

Hosted by Institute for the Advanced Study of Human Biology (WPI-ASHBi)

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