

Press release

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Basic information

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Department of: Biomedicine

Main supervisor: Professor Marco Capogna

Title of dissertation: Stimulus-dependent permanent labeling of neuronal ensembles pattern and circuit connectivity using viral TRAP strategy

Date for defence: 15 June, 2021 at (time of day): 14:00 Place: Virtual Zoom (Meeting ID: 639 7937 7019)

Press release (Danish)

Gnaverhjernen indeholder millioner af nerveceller (neuroner). Vil alle neuroner aktiveres på samme tid under en adfærd? Hvordan er neuronerne forbundet med hinanden? Hvad sker der, hvis nogle aktiverede neuroner manipuleres?

Et af de grundlæggende mål inden for neurovidenskab er at forstå, hvordan hjernen præsenterer de eksterne stimuli gennem netværkskoordinering. Ældre teknikker var begrænset til neuroanatomiske og histologiske tilgange, men for at definere neuroner via deres aktiveringsmønstre og genetiske komponenter kræves der nye teknologier. Nylige fremskridt inden for genetiske værktøjer har vist sig at være i stand til at fange, hvordan hjernen repræsenterer adfærd og ændrer følelsesmæssige tilstande.

I mit ph.d. studie er en nyudviklet genetisk strategi, TRAP (Targeted Recombination in Active Populations), blevet brugt til at opnå genetisk kontrol i neuroner, der udtrykker højere niveauer af fos (et øjeblikkeligt tidligt gen) knyttet til en bestemt adfærd. I tilfælde af hukommelsesdannelse kaldes kohorten af neuroner, der udtrykker fos, engram.

Således viser resultaterne i afhandling to nye tilgange, der muliggøre: 1) mærkning af aktive input specifikke for stimuli uden forudgående viden til deres oprindelse og 2) funktionelle beviser for dannelse af engram og manipulation i den centrale laterale amygdala. Disse nye tilgange, som jeg har anvendt til den emotionelle kortlægning af hjerne kredsløbet, kunne i fremtiden udvides til at undersøge de neurale kredsløb, der driver endnu mere kompleks adfærd som sansning og kognition.

Projektet er gennemført af Meet Jariwala, der forsvare det d. 15 June 2021.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 15 June 2021 kl. 14:00 i virtual Zoom (ID: 639 7937 7019). Titlen på projektet er "Stimulus-dependent permanent labeling of neuronal ensembles pattern and circuit connectivity using viral TRAP strategy".

Yderligere oplysninger: Ph.d.-studerende Meet Jariwala, e-mail: meet.jariwala@biomed.au.dk, tlf. +45 91447038.

The members of the assessment committee are
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Press release (English)

The rodent brain contains millions of nerve cells (neurons). Will all neurons activate at the same time during a behavior? How the neurons are connected with each other? What happens if some activated neurons are manipulated?

One of the fundamental aims in modern neuroscience is to understand how the brain represents the external environment through the network coordination. Classical techniques were limited to neuroanatomical and histological approaches but to define neurons by their activation pattern and genetic components require novel technologies. Recent advances in genetic tools are able to capture how the brain represents behavior and alter emotional states.

In my PhD study, a newly developed genetic strategy, TRAP (Targeted Recombination in Active Populations), has been used to gain genetic control in neurons that express high level of fos (an immediate early gene) linked to a specific behavior. In the case of memory formation, the cohort of neurons that express fos is called engram.

Thus, the results of my thesis show two novel approaches that provide: 1) labelling of active inputs specific to stimuli without prior knowledge of their origins and 2) functional evidence of engram formation and manipulation in the central lateral amygdala. These achievements that I have applied to mapping of the emotional brain circuit could be extended in the future to examine the neuronal circuits underlying even more complex behaviors such as perception and cognition.

The project was carried out by Meet Jariwala, who is defending his dissertation on 15 June 2021.

The defence is public and takes place on 15 June 2021 at 14:00 on virtual Zoom (ID: 639 7937 7019). The title of the project is 'Stimulus-dependent permanent labeling of neuronal ensembles pattern and circuit connectivity using viral TRAP strategy'. For more information, please contact PhD student Meet Jariwala, email: meet.jariwala@biomed.au.dk, Phone +45 91447038.

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