

Press release

Please fill in this form and return it to graduateschoolhealth@au.dk in Word format no later than three weeks prior to your defence.

Basic information

Name: Katia Soud Email: katia.soud@biomed.au.dk Phone: +45 81914866

Department of: Biomedicine

Main supervisor: Tomonori Takeuchi

Title of dissertation: Investigation of Dopamine Release in the Dorsal Hippocampus upon Novelty Exploration and Optogenetic Stimulation of the Locus Coeruleus

Date for defence: 05-04-2024 at (time of day): 13:00 Place: Aarhus Universitet, Lokale 1231-424 (Lille Anatomisk Auditorium), Wilhelm Meyers Alle 3, 8000 Aarhus C

Press release (Danish)

Locus coeruleus's noradrenalin og dopamin frigives samtidig i hippocampus, hvilken driver hukommelsesboost efter nye oplevelser?

Hverdagsoplevelser bliver ofte glemt, medmindre de er forbundet med ekstraordinære begivenheder. For eksempel har mange en detaljeret erindring om deres indkøb i supermarkedet, kort efter annonceringen af den første COVID-19 lockdown. Detaljerne omkring denne hverdags aktivitet, forstærkes i vores hukommelse, på grund af de usædvanlige omstændigheder. Forskning, der undersøger dette fænomen, peger på at det noradrenerge system, specifikt locus coeruleus, spiller en central rolle i processen. Locus coeruleus, faciliterer hukommelse gennem en forbindelse med hippocampus. Nylige undersøgelser, der udfordrer vores gængse opfattelse, har antydnet muligheden for at locus coeruleus, udover at frigive noradrenalin, også frigiver dopamin. Det rejser spørgsmålet, er det noradrenalin eller dopamin, der er afgørende i denne hukommelsesproces? I mine forsøg har jeg brugt fluorescerende biosensorer til at lave detaljerede målinger af dopamin og noradrenalin niveauer, under aktivering af locus coeruleus. Dette er gjort med optogenetik eller ved at eksponere rotterne for ekstraordinære miljøer. Mine forsøg afslørede simultan frigivelse af både dopamin og noradrenalin. Efterfølgende forsøg, med brug af hippocampale hjernesnit, understregede behovet for forbedrede metoder, til præcist at differentiere i mellem disse to neuromodulatorer. Mine resultater kaster lys over det komplekse samspil mellem neuromodulatorer i hukommelsesprocesser og baner vejen for yderligere undersøgelser indenfor dette forskningsområde.

Manchet - indledning - afsluttes med ...et nyt ph.d.-projekt fra Aarhus Universitet, Health. Projektet er gennemført af Katia Soud, der forsvaret det d. 05/04

Pressemeddelelsen - afsluttes med: Forsvaret af ph.d.-projektet er offentligt og finder sted den 05/04 kl. 13:00 i Lokale 1231-424 (Lille Anatomisk Auditorium), Aarhus Universitet, Wilhelm Meyers Alle 3, 8000 Aarhus C.

Titlen på projektet er "Undersøgelse af dopaminfrigivelse i dorsal Hippocampus efter nyhedsudforskning og optogenetisk stimulering af Locus Coeruleus".

Yderligere oplysninger: Ph.d.-studerende Katia Soud,
e-mail: katia.soud@biomed.au.dk,
tlf. +45 81914866.

Bedømmelsesudvalg: påfør de tre medlemmer af udvalget med navn, titel og arbejdssted
Associate Professor Steffen Sinning -formand for udvalget og ordstyrer for forsvaret
Retsmedicinsk Institut
Århus Universitet
Århus N, Danmark

Professor Gisella Vetere
Cerebral Codes and Circuits Connectivity Team Brain Plasticity Unit
École supérieure de physique et de chimie industrielles (ESPCI)
Paris, Frankrig

Associate Professor Rune Berg
Institut for Neurovidenskab
København Universitet
København, Danmark

Press release (English)

The locus coeruleus's norepinephrine and dopamine co-release in the hippocampus, which is the driver of memory boost after novel experiences?

Everyday experiences are often forgotten, unless associated with extraordinary events. For instance, ordinary activities like grocery shopping during the initial COVID-19 lockdown became memorable due to the unprecedented circumstances. Scientists have delved into this phenomenon, revealing the pivotal involvement of the noradrenergic nuclei, the locus coeruleus, in memory consolidation. The locus coeruleus, through its connection with the hippocampus, facilitates memory formation. Recent studies, challenging our previous conception, have suggested the possibility of dopamine co-release from the locus coeruleus, posing intriguing questions regarding the primary neuromodulator responsible for novelty enhanced memory persistence. Norepinephrine, or Dopamine? In this study, I employed live monitoring of dopamine and norepinephrine release, via fluorescent biosensors, following external activation of the locus coeruleus using optogenetics, or coupled with exposure to novel environments in transgenic rats. Our in-vivo fiber-photometry investigation unveiled the simultaneous release of both neuromodulators in the hippocampus from the locus coeruleus. Subsequent experiments utilizing hippocampal slices underscored the need for improved techniques to accurately differentiate between these two neuromodulators. My findings shed light on the complex interplay between neuromodulators in memory processes, paving the way for further studies and a better understanding.

The project was carried out by Katia Soud, who is defending her dissertation on 05/04.

The press release: The defence is public and takes place on 05/04 at 13:00 in Lokale 1231-424, Aarhus University, Wilhelm Meyers Alle 3, Aarhus C.

The title of the project is Investigation of Dopamine Release in the Dorsal Hippocampus upon Novelty Exploration and Optogenetic Stimulation of the Locus Coeruleus.

For more information, please contact PhD student Katia Soud:
email: katia.soud@biomed.au.dk
Phone +45 81914866.

Assessment committee:
Associate Professor Steffen Sinning - chairman of the committee and moderator of the defence
Department of Forensic Medicine
Aarhus University
Aarhus N, Denmark

Professor Gisella Vetere
Cerebral Codes and Circuits Connectivity Team Brain Plasticity Unit
École supérieure de physique et de chimie industrielles (ESPCI)
Paris, France

Associate Professor Rune Berg
Department of Neuroscience
University of Copenhagen
Copenhagen, Denmark

Permission

By sending in this form:

- I hereby grant permission to publish the above Danish and English press releases.
- I confirm that I have been informed that any applicable inventions shall be treated confidentially and shall under no circumstances whatsoever be published, presented or mentioned prior to submission of a patent application, and that I have an obligation to inform my head of department and the university's Patents Committee if I believe I have made an invention in connection with my work. I also confirm that I am not aware that publication violates any other possible holders of a copyright.