

Press release

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Basic information

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Department of: Clinical Medicine

Main supervisor: Toke Bek

Title of dissertation: ATP mediated diameter regulation of porcine retinal vessels at different branching levels ex vivo

Date for defence: 14. january 2022 at (time of day): 14:00 Place: Auditorium G206-142, Aarhus Universitetshospital, Skejby.

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Meeting ID: 698 5999 8001 Passcode: 336329

Press release (Danish)

ATP medieret diameter regulering af nethindens blodkar på forskellige forgreningsniveauer i en grisemodel ex vivo

Forstyrrelser i reguleringen af nethindens blodgennemstrømning er involveret i udviklingen af nogle af de hyppigste synstruende sygdomme i den vestlige verden, såsom diabetisk retinopati. Udviklingen af nye behandlingsmuligheder mod disse øjensygdomme kræver kendskab til hvilke mekanismer, som regulerer nethindens blodgennemstrømning under normale forhold.

Energi- og signalmolekylet adenosintrifosfat (ATP) har vist sig at være en af de vigtigste mediatorer for reguleringen af blodgennemstrømningen gennem de større blodkar i nethinden, mens der mangler viden om effekten på de mindre blodkar i nethinden. Derfor har formålet med denne ph.d.-afhandling været at belyse rollen af det purinerge nukleotid ATP for diameterreguleringen af blodkarrene i nethinden på forskellige forgreningsniveauer.

Til projektet blev der anvendt fridissekerede nethinder fra friske griseøjne. Disse blev monteret i et specialdesignet vævskammer, som muliggør undersøgelse af diameterreguleringen af alle vaskulære forgreningsniveauer i nethinden ved samtidig kontrol af pH, temperatur og iltmætning. Derudover blev vævskammeret modificeret til at kunne registrere calciumaktivitet i celler på overfladen af blodkarrene efter loading med en calciumfølsom fluorofor samtidig med diameteroptagelserne.

Opnåelse af ny viden om hvilke mekanismer og celler, der er involveret i diameterreguleringen af nethindens blodkar, er en forudsætning for at kunne udvikle ny og bedre behandling af de øjensygdomme, hvor ændringer i nethindens blodgennemstrømning er involveret i patogenesen såsom diabetisk retinopati.

Ph.d.-projektet udgår fra Aarhus Universitet, Health. Projektet er gennemført af Charlotte Ernst, der forsvare det d. 14. januar 2022.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 14. januar 2022 kl. 14.00 i Auditorium G206-142, Aarhus Universitetshospital, Skejby.

Titlen på projektet er "ATP mediated diameter regulation of porcine retinal vessels at different branching levels ex vivo".

Yderligere oplysninger: Ph.d.-studerende Charlotte Ernst, e-mail: ce@clin.au.dk.

Bedømmelsesudvalg:

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Professor Jesper Hjortdal, MD, ph.d., dr.med., Institut for Klinisk Medicin, Øjenafdelingen, Aarhus Universitetshospital (formand og moderator)

Press release (English)

ATP mediated diameter regulation of porcine retinal vessels at different branching levels ex vivo

Disturbances in the regulation of retinal blood flow are involved in some of the major vision-threatening diseases in the Western world including diabetic retinopathy. The development of new therapies to treat these diseases requires knowledge of the mechanisms underlying the regulation of retinal blood flow under normal conditions.

The energy- and signaling molecule adenosine triphosphate (ATP) is known to be one of the key mediators of retinal blood flow regulation on the larger retinal arterioles while the vasoactive effects on the smaller retinal blood vessels remain unknown. Therefore, the purpose of the present PhD dissertation was to elucidate the role of the purine nucleotide ATP for the diameter regulation of retinal vessels at different branching levels.

For the experiments, hemiretinas from fresh pig eyes were used. The hemiretinas were mounted in a specially designed tissue chamber which allows the examination of the diameter regulation of all vascular branching levels in the retina during the control of pH, temperature, and oxygen tension. In addition, the tissue chamber was modified in order to record fluorescence from retinal cells loaded with a calcium-sensitive fluorophore simultaneously with the diameter recordings.

A deeper understanding of the mechanisms and cells involved in diameter regulation of retinal arterioles at different branching levels can be used to obtain a more detailed understanding of diseases where changes in the diameter regulation of retinal vessels are involved in the disease pathogenesis and possibly point to new therapeutic options for retinal vascular disease such as diabetic retinopathy.

The project was carried out by Charlotte Ernst, who is defending her dissertation on 14th January 2022.

The defence is public and takes place on 14th January 2022 at 14.00 in Auditorium G206-142, Aarhus Universitetshospital, Skejby.

The title of the project is "ATP mediated diameter regulation of porcine retinal vessels at different branching levels ex vivo".

For more information, please contact PhD student Charlotte Ernst, email: ce@clin.au.dk.

Assessment committee:

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