AARHUS UNIVERSITY

# Press release

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**Basic information**

Name: Karthiga Thavachelvam Email: Karthiga@biomed.au.dk Phone: 45+ 31952809

Department of: Biomedicine

Main supervisor: Martin R. Jakobsen

Title of dissertation: T cells permissiveness to CCR5-tropic HIV inhibited by OAS proteins

Date for defence: 22.06.2020 at (time of day): 14.00 Place: Zoom

Press release (Danish)

## T-cellers tilgængelighed overfor CCR5-tropisk HIV er inhiberet af OAS proteiner

Et nyt ph.d.-projekt fra Aarhus Universitet, Health, omhandler det immun regulatoriske protein OAS. Det viser sig at OAS kan beskytte imod HIV infektion og kan dermed åbner for nye behandlingsmuligheder. Projektet er gennemført af PhD studerende, Cand.Scient. Karthiga Thavachelvam, der forsvarer PhD'en den 22/06/2020.

I dag er over 36 millioner mennesker HIV-positive på verdensplan, og antallet stiger fortsat med omkring 3 millioner om året. Til trods for mere end 35 års forskning i HIV findes der dog stadig ingen kur imod sygdommen. Et kendt immunprotein, oligoadenylatsyntetase 1 (OAS1), har tidligere vist at kunne beskytte imod forskellige virusser såsom encephalomyocarditis, vesikulær stomatitis og herpex simplex virus.
I dette studie undersøgte jeg, hvorvidt OAS kunne beskytte T-celler imod HIV infektion, samt belyse de mekanismer der eventuelt lagde grund for sådan en beskyttelse.
Projektet viste at OAS havde en stærk beskyttelse imod bestemte HIV virus stammer, de såkaldte CCR5-tropiske stammer. Desværre førte studiet ikke til en klar mekanistisk forståelse for hvordan hæmningen af HIV foregik i T-cellerne.
I et sidestudie undersøgte vi reguleringen af CCR5-receptoren i humane T-celler. Da CCR5-receptoren er den primære receptor HIV benytter sig af til at etablere infektionen i en ny person, er viden om denne receptor yderst relevant. I projektet opdagede vi at, at der var markant højere udtryk af CCR5 i de CD4+ T-celler, som var blevet aktiveret sammen med andre immuneceller sammenlignet medCD4+ T-celler, der blev aktiveret under "rene" betingelser. Vi fandt ud af, at forskellige signalmolekyle fra andre immunceller var medvirkende til at øge udtrykket af CCR5 og derigennem gøre T-cellerne mere modtagelige for HIV infektionen.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 22/06 kl. 14.00 på Zoom, Aarhus Universitet, Batholins alle 6, Aarhus. Titlen på projektet er ”T cells permissiveness to CCR5-tropic HIV inhibited by OAS proteins”. Yderligere oplysninger: Ph.d.-studerende Karthiga Thavachelvam, e-mail: Karthiga@biomed.au.dk, tlf. 45+ 31952809.

Bedømmelsesudvalg:
Bent Deleuran, Professor, Aarhus Universitet, Danmark
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Malathi Krishamurthy, Associate Professor, Universitet af Telado, USA

Press release (English)
T cells permissiveness to CCR5-tropic HIV inhibited by OAS proteins

A new PhD project from Aarhus University about the immunprotein OAS that protect against HIV and thereby creates new possibilities for new treatment. The project have been carriedout by Karthiga Thavachelvam and defence will be on 22/06/2020.

Today, there are more than 36 million HIV-positive people worldwide and the number is increasing with around 3 million per year. Even though research in HIV has been ongoing for more than 35 years, we still have no cure for the disease. A well-known immune protein called oligoadenylate synthetase 1 (OAS1) has previously been shown to be able to protect cells from infection by viruses such as encephalomyocarditis, vesicular stomatitis and herpes simplex virus.
In this study, I have investigated the possible antiviral role of extracellular OAS against HIV infection and tried to determine the mechanism behind it. I found that OAS was able to protect against HIV infection and more precise a specific HIV strain called CCR5 tropic strains. Unfortunately, the mechanism still remains unknown.
In a side project, we also investigated the expression of the CCR5 receptor on CD4+ T cells. The CCR5 receptor is of particular interest because its is used by HIV to infect new people, the knowledge about this is important. In this project we found that The expression of CCR5 was significantly higher on CD4+ T cells activated with other immuncells compared to those isolated first "pure" and then activated. This difference in expression of CCR5 also correlated with the ability of HIV to infect these cells. We found that singnaling molecules from other immun cells constibuted to the increased expression of CCR5 and thereby making T-cells more receptive towards HIV infection.

The defence is public and takes place on 22. June 2020 at Zoom, Aarhus University. The title of the project is "T cells permissiveness to CCR5-tropic HIV inhibited by OAS proteins". For more information, please contact PhD student Karthiga Thavachelvam, email: Karthiga@biomed.au.dk, Phone +45 31952809.

Assessment committee:
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