Press release

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Basic information

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Department of: Biomedicine

Main supervisor: Anders Lade Nielsen

Title of dissertation: Epithelial-mesenchymal transition and EGFR-TKI resistance in NSCLC - From in vitro induction to in vivo detection

Date for defence: 14/8 at (time of day): 01.00 pm Place: Eduard Biermann auditorium (1252-204)

Press release (Danish)

Klarlæggelse af molekylære mekanismer der ligger til grund for resistensudvikling i forbindelse med behandling af lungekræft og udvikling af en ny metode til forbedret patient diagnostik

Et nyt ph.d.-projekt fra Aarhus Universitet, Health har udviklet nye molekylærer værktøjer som har bidraget til en øget forståelse af de molekylærer mekanismer i det cellulærer udviklingsprogram epitelial-mesenchymal transition (EMT) der medfører resistens overfor EGFR-targetered behandling i EGFR muterede lungecancer patienter. Projektet har desuden udviklet en ny blodbaseret metode indenfor diagnostik, der potentielt vil kunne bruges til påvisning af EMT i en blodprøve fra disse patienter. Projektet er gennemført af Johan Vad-Nielsen, der forsvarer det d. 14 august 2019.

Lungecancer er fortsat en af de førende dødårsager i verden med mere end 4600 nye diagnostiserede patienter om året i Danmark alene. Mutationer i EGFR genet er hyppige og udvikling af targeteret behandling mod EGFR har vist sig at være en effektiv behandling, men alle behandlede patienter vil udvikle resistens over tid. En resistensmeksnisme der har haft stigende interesse de senere år er EMT. EMT beskriver epitelcellers transformation til mesenkymale celler som har en øget overlevelse overfor EGFR targeteret behandling. Hvad der ligger til grund for denne øgede overlevelse efter EMT er endnu uvis. I forbindelse med sit ph.d projekt har Johan Vad-Nielsen udviklet nye metoder indenfor den revolutionerende CRISPR/Cas teknologi til effiktivt at kunne aktivere flere gener på samme tid. Disse metoder bliver i projektet anvendt til at inducere EMT i lungecancer celler og undersøge årsag-virknings forholdet mellem EMT, FGFR1-genet der ofte ses kraftigt opreguleret i forbindelse med EMT, og resistens overfor EGFR-targeteret behandling. Projektet har desuden til mål at beskrive og kortlægge den epigenetiske indflydelse på genreguleringen i EMT som vil kunne anvendes til klinisk at påvise EMT i en blodprøve fra patienter via en ny diagnostisk metode som Johan Vad-Nielsen også har udviklet i forbindelse med projektet.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 14/8 kl. 13 i Eduard Biermann auditorium, Aarhus Universitet, Bartholins Allé 3, Århus. Titlen på projektet er "Epithelial-mesenchymal transition and EGFR-TKI resistance in NSCLC - From in vitro induction to in vivo detection". Yderligere oplysninger: Ph.d.-studerende Johan Vad-Nielsen, e-mail: johanvn@biomed.au.dk, tlf. 20645705.

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Press release (English)

Clarification of molecular mechanisms underlying resistance development in the treatment of lung cancer and the development of a new method for improved patient diagnostics

A new PhD project from Aarhus University, Health, has developed new molecular tools that have contributed to an increased understanding of the molecular mechanisms of the cellular developmental program epithelial-mesenchymal transition (EMT) that results in resistance to EGFR-targeted treatment in EGFR mutated lung cancer patients. The project has also developed a new blood-based method within diagnostics that could potentially be used to detect EMT in a blood sample from these patients. The project was carried out by Johan Vad-Nielsen, who is defending his dissertation on August 14, 2019.

Lung cancer remains one of the leading causes of death world-wide, with more than 4600 newly diagnosed patients per year in Denmark alone. Mutations in the EGFR gene are frequent, and the development of EGFR-targeted treatment has proven to be effective. However, all treated patients will develop resistance over time. One resistance mechanism that has gained increasing interest in recent years is EMT. EMT describes the transformation of epithelial cells into mesenchymal cells that have an increased survival against EGFR-targeted treatment. The reason for the increased survival after EMT is still unknown. In connection with his PhD project, Johan Vad-Nielsen has developed new methods within the revolutionary CRISPR/Cas technology, to effectively activate several genes at the same time. These methods are used in the project to induce EMT in lung cancer cells and to investigate the causal relationship between EMT, the FGFR1 gene that is often strongly upregulated in connection with EMT, and resistance to EGFR-targeted therapy. The project also aims to describe and map the epigenetic influence on gene regulation in EMT. Furthermore, this can be used to clinically detect EMT in a blood sample from patients via a new diagnostic method that Johan Vad-Nielsen has also developed in connection with the project.

The defence is public and takes place on August 14 at 1.00 PM in Eduard Biermann auditorium, Aarhus University, Bartholins Allé 3, Aarhus. The title of the project is Epithelial-mesenchymal transition and EGFR-TKI resistance in NSCLC - From in vitro induction to in vivo detection. For more information, please contact PhD student Johan Vad-Nielsen, email: johanvn@biomed.au.dk, Phone +45 20645705.

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