

Press release

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Basic information

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Department of: Clinical Medicine

Main supervisor: Jakob Skou Pedersen

Title of dissertation: Circular RNAs in cancer and their biomarker potential

Date for defence: Dec. 4th 2019 at (time of day): 13:00 Place: Department of Molecular Medicine, Brendstrupgaardsvej 21A, 8200 Aarhus N, Denmark

Press release (Danish)

Circulære RNA transkripter i kræft og deres biomarkør potentiale

Cirkulære RNA transkripter (circRNA) er associeret med overlevelse og kan besidde vigtige regulatoriske evner i udviklingen af kræftceller. Det viser et nyt ph.d.-projekt fra Aarhus Universitet, Health. Projektet er gennemført af Trine Line Hauge Okholm, der forsvare det d. 04/12 2019.

CircRNA'er er enkelt-strengede cirkulære molekyler, der opstår fra mRNA. Disse cirkulære transkripter har fået meget opmærksomhed de sidste par år, efter man i 2013 opdagede, at enkelte circRNA'er kan fungere som microRNA-"svampe". Siden er flere tusinde circRNA'er blevet identificeret, hvoraf mange er højt udtrykt i mennesker og konserverede mellem arter. Et stigende antal studier kæder circRNA'er sammen med udvikling og progression af forskellige sygdomme, og flere studier har vist, at circRNA'er er involveret i udviklingen af kræft og har biomarkør potentiale. Der er imidlertid stadig meget, vi ikke ved om deres kliniske værdi og egentlige funktion i kræft.

Formålet med dette ph.d.-projekt var at karakterisere udtrykket af circRNA'er i kræft samt undersøge deres biomarkør potentiale og funktionelle rolle.

Ved at analysere store patient kohorter og genomiske datasæt har vi vist at udtrykket af circRNA'er korrelerer med kliniske parametre, og at højtudtrykte circRNA'er besidder mange biologiske egenskaber, der adskiller dem fra lavtudtrykte circRNA'er og fra ikke-cirkulariserende exons i blærekræft. Derudover, har vi evalueret circRNA'ers potentiale til at interagere med RNA-bindende proteiner og analyseret funktionen af to højtudtrykte circRNA'er, der er korreleret med god prognose og overlevelse, circHIPK3 og circCDYL. Resultaterne fra dette ph.d.-projekt giver et overblik over udtrykket af circRNA'er i blærekræft, deres potentielle regulatoriske roller og kliniske associationer og belyser funktionen og det kliniske potentiale for specifikke circRNA'er i kræft.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 04/12-2019 kl. 13:00 i auditoriet i stueetagen, Molekylære Medicinsk Afdeling, Aarhus Universitetshospital, Brendstrupgaardsvej 21A, 8200 Aarhus N. Titlen på projektet er "Circular RNAs in cancer and their biomarker potential".

Yderligere oplysninger: Ph.d.-studerende Trine Line Hauge Okholm, e-mail: trine.okholm@clin.au.dk, tlf. +45 78455310.

Bedømmelsesudvalg:

Jakob Giehm Mikkelsen, Professor, Department of Biomedicine, Aarhus University, Aarhus, Denmark
Jens Lykke-Andersen, Professor, Division of Biological Sciences, University of California San Diego, San Diego, California, USA

Sakari Kauppinen, Professor, Department of Clinical Medicine, Aalborg University, Copenhagen, Denmark

Press release (English)

Circular RNAs in cancer and their biomarker potential

Circular RNAs (circRNAs) are covalently closed, single-stranded transcripts produced from precursor mRNA. They have attracted great attention since the discovery in 2013 that some circRNAs can serve as miRNA sponges. Since then, thousands of circRNAs have been identified, many of which are highly expressed and conserved between species. Emerging evidence links circRNAs to development and progression of different diseases, and several studies have shown that circRNAs are involved in tumorigenesis and possess biomarker potential. However, the clinical value and function of most circRNAs in cancer is still unknown.

The goal of this PhD project was to characterize the expression of circRNAs in cancer and explore their biomarker potential and functional role in tumorigenesis. The project was carried out by Trine Line Hauge Okholm, who is defending her dissertation on December 4th 2019.

By analyzing large patient cohorts and genomic data sets, we showed that the expression of circRNAs correlate with good clinical outcomes and that highly expressed circRNAs possess key biological features that distinguish them from lowly expressed circRNAs and non-circularizing exons in bladder cancer. Furthermore, we evaluated the overall possibility of circRNAs to interact with RNA binding proteins and described the function of two highly expressed and clinically correlated circRNAs, circHIPK3 and circCDYL. In conclusion, the results from this PhD project provide a global-scale catalogue of circRNA expression in bladder cancer, their potential regulatory roles and clinical associations, and enlighten the functional role and clinical potential of specific circRNAs in cancer.

The defence is public and takes place on December 4th 2019 at 1 pm in the auditorium on the ground floor at Department of Molecular Medicine, Aarhus University Hospital, Brenstrupgaardsvej 21A, 8200 Aarhus N. The title of the project is "Circular RNAs in cancer and their biomarker potential". For more information, please contact PhD student Trine Line Hauge Okholm, email: trine.okholm@clin.au.dk, Phone +45 78455310.

Assessment committee:

Jakob Giehm Mikkelsen, Professor, Department of Biomedicine, Aarhus University, Aarhus, Denmark
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