

## Press release

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

### Basic information

Name: Jesper Pedersen      Email: [jesped@oncology.au.dk](mailto:jesped@oncology.au.dk) Phone: 25365220

Department of: Public Health

Main supervisor: Ludvig P Muren, Prof, PhD

Title of dissertation: Proton therapy specific normal tissue complication probability models for the rectum and bladder

Date for defence: 28/05-2020 at (time of day): 14.00 Place: Zoom

Press release (Danish)

Protonterapi specifikke sandsynlighedsmodeller til at estimere følgeskader i rektum og blære som følge af behandling af prostatakraft med protonterapi.

Gennem de seneste år er protonterapi blevet en attraktiv behandlingsform inden for kræftbehandling. Senest har Danmark fået sit første protoncenter i Skejby, som tilbyder netop denne type behandling. Forskellen mellem protonterapi og konventionel behandling med fotoner ligger i fysikken bag de to forskellige typer partikler, som primært gør at de afsætter deres energi (dosis) forskelligt. Den korrekte mængde dosis er det man gerne vil ramme kræfttumoren præcist med, for at slå kræften ihjel. Samtidig vil man gerne minimere dosis til det omliggende væv så meget som muligt, da det kan give følgeskader, som markant kan ændre livskvaliteten hos patienter.

Ved nogle kræftformer er protonterapi en åbenlys bedre behandlingsform, hvor det ved andre er ikke er helt så entydigt. En af måderne, hvor man kan vurdere om en behandlingsform er mere attraktiv end en anden, er vha. såkaldte sandsynlighedsmodeller for normalvævskomplikationer. Her kan forskellige behandlingsplaner sammenlignes, både inden for samme behandlingsmetode eller forskellige, hvilket kan give en indikation om, hvilket behandling der vil være bedste for den enkelte patient.

Protonterapi er dog stadig en relativ ny behandlingsform ift. konventionel behandling, hvilket betyder, at få studier og modeller findes. I dette studie har en af verdens største prospektive prostatakraftkohorter, behandlet med protonterapi, været brugt som basis til udvikle protonspecifikke modeller for at kunne estimere følgevirkningerne i rektum og blære som følge af protonterapi.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 28/05 kl. 14.00. Grundet COVID-19 vil forsvaret blive gennemført som et web forsvar via Zoom. For at deltage i forsvaret skal du sende en mail til [jesped@oncology.au.dk](mailto:jesped@oncology.au.dk) for at modtage en invitation med et link til Zoom.

Titlen på projektet er "Proton therapy specific normal tissue complication probability models for the rectum and bladder". Yderligere oplysninger: Ph.d.-studerende Jesper Pedersen, e-mail: [jesped@oncology.au.dk](mailto:jesped@oncology.au.dk), tlf. +45 25365220.

Bedømmelsesudvalg:

Arjen van der Schaaf, PhD  
Cancer Center  
University of Groningen

Markus Stock, Associate Professor, PhD

Department of Radiotherapy  
Medical University of Vienna

Brita Singers Sørensen, Associate Professor, PhD  
Department of Experimental Clinical Oncology  
Aarhus University Hospital, Denmark  
(Chair of the Committee)

Press release (English)

Proton therapy specific normal tissue complication probability models for the rectum and bladder

In the last few decades proton therapy has become an increasingly more popular modality within cancer treatment. In 2019 the first Danish proton center opened to offer treatment with this exact modality. The difference between proton therapy and conventional therapy with photons primarily arises from the physics defining the two different particles, i.e. how they deposit their energy in tissue. The correct amount of energy (dose) is what you want to aim at the tumour in order to kill it. At the same time, you want to minimise the dose to the normal tissues adjacent to the tumour target in order to reduce adverse effects, which could drastically reduce the quality of life of the patient.

For some types of cancer proton therapy is the apparent treatment modality. However, for others this is not always the case. One way to determine whether one treatment plan is more attractive than another is through so-called normal tissue complication probability models. From these models it is possible to compare treatment plans of the same modality or between different modalities in order to get an indication of which treatment will minimise the adverse effects of the patient.

Proton therapy is, however, still a relatively new modality in that few studies and models exist. In this study, one of the largest prospective prostate cancer cohorts treated with proton therapy have been used as a basis for the development of normal tissue complication probability models to estimate the adverse effects of the rectum and bladder following proton therapy.

The defence is public and takes place on 28/05 at 14:00. Due to COVID-19, the defence will be held online via Zoom. Please contact PhD student Jesper Pedersen (jesped@oncology.au.dk) to receive a link to participate in the defence online.

The title of the project is "Proton therapy specific normal tissue complication probability models for the rectum and bladder".

Assessment committee:

Arjen van der Schaaf, PhD  
Cancer Center  
University of Groningen

Markus Stock, Associate Professor, PhD  
Department of Radiotherapy  
Medical University of Vienna

Brita Singers Sørensen, Associate Professor, PhD  
Department of Experimental Clinical Oncology  
Aarhus University Hospital, Denmark  
(Chair of the Committee)

## 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.