Introduction of new human *ex vivo* model systems to study tumorigenesis in kidney cancer

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Kidney cancer in Denmark

![Graph showing kidney cancer incidence rates in Denmark from 2011 to 2019, with separate lines for men, women, and all ages combined.](image)
Subtypes of kidney cancer

- Clear cell renal cell carcinoma (75-90%)
- Papillary renal cell carcinoma (10-15%)
- Chromophobe renal cell carcinoma (4-5%)
- Rare type of renal cell carcinoma (<1%)
5-year survival of patients with kidney cancer
Treatment of kidney cancer in Denmark

- Disease restricted to the kidney
  - Surgical intervention (nephrectomy, partial nephrectomy, cryotherapy)

- Advanced disease
  - Medical intervention (tyrosine kinase inhibitor treatment, immunotherapy)
What is new within cancer treatment

"One drug for all"

"Individualized treatment"
Aims of the project

- Establish and validate new *ex vivo* model systems based on freshly removed tumor tissue from kidney cancer patients that can be used to identify drug targets

- Test the vasopressin receptor type 2 signaling pathway that has recently been described to be involved in tumor cell proliferation in animal studies

- Replace and reduce the number of animals used for experimental research of kidney cancer
Methodology

Patient diagnosed with kidney cancer

Surgical treatment (nephrectomy/partial nephrectomy) at Department of Urology, OUH

Kidney transferred to Department of Pathology, OUH immediately after removal

Ex vivo systems:
- Primary cultures
- Tumor tissue slice cultures
- 3D spheroids

Tissue is transferred Department of Cardiovascular and Renal Research, University of Southern Denmark for processing

A piece of tumor tissue is removed after initial pathological inspection
The corona pandemic and how it affects the project

- Project is initiated: May 1st, 2020
- Inclusion of patients initiated: August 1st, 2020
- Inclusion of patients paused: December 1st, 2020
- Inclusion of patients resumed: April 1st, 2021

1st corona lock down: May 1st, 2020
2nd corona lock down: April 1st, 2021
Preliminary results

Protocol for primary cultures of tumor cells established

Upcoming:
Characterize the cellular composition of the culture
Determine if cellular characteristics are maintained over time
Preliminary results

Protocol for precision cut tumor slice cultures has been establish

Upcoming:
Characterize the viability of the tissue slices over time
Determine if cellular characteristics are maintained over time
Preliminary results

Established a cohort of clear cell renal cell carcinoma patients from local biobank (n=113)

Analysed expression profile of the vasopressin receptor type 2 in tumor tissue

Ongoing:
Correlation studies of vasopressin receptor type 2 abundance and prognostic characteristics of tumor aggressiveness
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