The aim of the project is to investigate the role of angiotensin-(1-7) in the development and progression of renal cancer.

Cancer is the second, after cardiovascular diseases, cause of death worldwide. Even though renal cancer accounts for only 3% of all malignancies, it is associated with high metastatic potential and short survival rates. Majority of patients develop distant metastases, while 30% presents with them at the moment of diagnosis. Despite development of new targeted therapies, that significantly improved patient survival, survival rates are still too low. Moreover, most patients develop resistance to therapy. In order to improve results of renal cancer treatment, many new studies on mechanisms involved in cancer development and progression are conducted.

It was observed in analysis of clinical trials that patients with renal cancer who were receiving inhibitors of renin-angiotensin system have better response to anticancer treatment and longer survival times. Based on this observation hypothesis on renin-angiotensin system in renal cancer pathogenesis was formed.

The renin-angiotensin system is mostly known from its action on cardiovascular system and blood pressure regulation. In recent years more evidence about procancerous role of angiotensin-II, main component of the system, has been published. In some tumors angiotensin-(1-7) plays contrary role. In lung, breast and prostate cancer and carcinomas of nasopharynx and liver inhibition in cell proliferation, tumor volume and density of blood vessels, have been observed. Opposite observation were made in studies on renal cancer cell lines, where angiotensin-1-7 promoted cell proliferation and invasion. Our aim is to investigate role of angiotensyn-1-7 in development and progression of renal cancer in animal model.

The experiment will be carried on mice who will receive subcutaneous injection of cancer cell to create renal tumors. Then osmotic pumps will be implanted to mice to allow infusions of angiotensin-(1-7), antagonist of receptor for angiotensin-(1-7), both substances together or saline. Changes in tumor volume will be assessed to evaluate influence of angiotensin-(1-7) and its receptor. Tumor will be collected and analysed with histopathological and molecular techniques to evaluate blood vessels density, cell proliferation rate and activation of cellular signalling pathways.

Explanation of role of angiotensin-(1-7) in renal cell carcinoma development will allow better understanding of processes involved in cancerogenesis and in further perspective help in selection of treatment. Results of the project will significantly broaden knowledge about potential use of angiotensin-(1-7) or its receptor as target for therapy of RCC.