

Study reveals complex biology, gender differences, in kidney cancer

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The research was led by senior author Chawnshang Chang, Ph.D., the George Hoyt Whipple Distinguished Professor of Pathology, Urology, and Radiation Oncology at the University of Rochester Medical Center and Wilmot Cancer Institute.

Chang's laboratory has produced a large body of work during the past decade investigating the link between [cancer](#) and the AR, which binds male hormones, transcribes DNA, and is critical for male sex characteristics.

The journal *Nature Communications* published the study, which shows that in [renal cell carcinoma](#) androgen signaling can either stimulate or suppress tumor cells' movement and invasion to different locations in the body.

In earlier research, Chang's lab also shed light on the duality of AR's role in different cancers. For example, AR signaling can enhance bladder cancer cell invasion but suppress prostate cancer cell invasion, he has found.

"In kidney cancer, many studies have provided conflicting information," Chang said. "In some cases AR expression has been associated with less malignancy. We were able to begin to sort out AR's function in this one disease, showing that AR-positive kidney tumors are more likely to spread to the lungs and AR-negative tumors are more likely to spread to the lymph nodes."

Chang's lab began its investigation with an epidemiology survey of

nearly 4,000 cases of kidney cancer in China. Researchers found that, generally, males were almost three times as likely to get [kidney](#) cancer as females. And among those whose cancer spread to the lungs within 12 months, the male-to-female ratio jumped to nearly five to one. In contrast, the gender differences were much less significant among the patients whose cancer spread to lymph nodes versus to the pulmonary system, presumably because the [cancer cells](#) contained fewer androgen receptors.

The next phase of their research included studying human cells and tissue to understand the mechanisms by which signaling among AR proteins interacted with other known cancer-associated genes to enhance or reduce metastasis.

Renal cell carcinoma or [kidney cancer](#) is often treated with surgery and radiation in less advanced cases, and also with chemotherapy, immunotherapy, and some newer, targeted drugs that block the growth-stimulating proteins in the cancer [cells](#). However, once it has spread it is difficult to treat. The cancer tends to resist chemotherapy and radiation, and targeted medications only extend survivorship an average of six to 15 months.

Chang believes his research may help scientists to develop newer approaches to treatment that could combine anti-androgens when appropriate with other targeted drugs already being used, to suppress the disease long-term.

Provided by University of Rochester Medical Center

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