MedicalXpress

New kidney cancer subtypes discovered

April 16 2013

Dr. Allan Pantuck. Credit: UCLA

Researchers with the Institute of Urologic Oncology and the Department of Urology at UCLA have classified kidney cancer into several unique subtypes, a finding that will help physicians tailor treatment to individual patients and that moves cancer care one step closer to personalized

medicine.

The finding is the result of 10 years of UCLA researchers studying kidney cancers at the genetic and molecular levels, conducting chromosomal analyses in an effort to identify what mutations may be causing and affecting the behavior of the malignancies. Thousands of tumors removed at UCLA have been studied, said Dr. Allan Pantuck, a professor of urology and director of genitourinary oncology at UCLA's Jonsson Comprehensive Cancer Center.

Traditionally, pathologists study tumors under the microscope and predict their expected behavior by the way they look. However, tumors that appear the same often behave differently and oncologists need to know which are lower risk, which are more aggressive and which are more likely to spread, which makes the cancer much more difficult to treat.

"Pathologists can give us some important information, but similar appearing tumors often can and do behave differently," Pantuck said. "Our findings have us heading further in the direction of personalized medicine based on the molecular signature of an individual's tumor. We still have a lot to learn, but we're now a step closer."

The study appears April 16, 2013 in in the early online edition of *Cancer*, a peer-reviewed journal of the American Cancer Society.

In this study, the findings were made in a type of cancer called clear cell renal carcinoma. The researchers found that in these subtypes of kidney cancer, there were deletions of the short arm of chromosome 3 and the long arm of chromosome 14. Most of the tumors examined had lost chromosome 3p, while a further subgroup among the tumors also had lost chromosome 14q.

This is significant because the short arm of 3p harbors a tumor suppressor gene. In the case of chromosome 14q, losing it results in the additional loss of a hypoxia-inducible factor 1 (HIF1) alpha gene, which mediates the effects of hypoxia, the state of low oxygen concentration, on the cell. Tumors need oxygen so they can grow and spread.

The study found that the loss of chromosome 3p was associated with improved survival, meaning these patients might not need to be treated as aggressively as tumors without loss of chromosome 3p, or the tumors could perhaps be monitored aggressively in elderly patients for evidence of progression instead of receiving immediate treatment. In tumors that lost both chromosome 3p and chromosome 14q, the patients had much worse outcomes.

"The results of this study support the hypothesis that the HIF1 alpha gene functions as another important tumor suppressor gene," Pantuck said. "With this finding, we can now decide to treat these patients with more aggressive therapies."

Going forward, Pantuck and his team will work to identify more subtypes of kidney cancer. The findings also come from a single center, so they will need to be reproduced by other scientists, he said.

This year alone, kidney cancer will strike more than 65,000, killing more than 13,000 Americans. Finding new and more effective therapies is vital to reducing the number of deaths.

Dr. Arie Belldegrun, director of the Institute of Urologic Oncology, characterized the finding as significant.

"Kidney cancer is not a single disease, and can now be further subdivided based on a clearly defined molecular profile. These researchers have identified unique molecular patterns in patients with

various stages of the disease," Belldegrun said. "These findings have important implications to the surgical and medical treatment of kidney cancer. It is one important step to individualize kidney cancer therapy and move away from the 'one size fits all' approach."

Provided by University of California, Los Angeles