Stat5 predicts outcomes for prostate cancer patients after radical prostatectomy

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Men who had high levels of the activated Stat5 protein in their prostate cancer after a radical prostatectomy were more likely to have a recurrence or die from the disease compared to men who had little to no presence of the growth protein, according to a recent study published in *Human Pathology* by Jefferson's Kimmel Cancer Center researchers.

This suggests, Stat5, a protein that when activated signals cancer cells to grow and survive, could be an ideal biomarker to help guide patients and physicians for future treatment.

The research team, led by Marja Nevalainen, M.D., Ph.D., associate professor of Cancer Biology, Medical Oncology and Urology at Jefferson Medical College of Thomas Jefferson University and Jefferson's Kimmel Cancer Center, examined prostate cancer biopsies and tumor tissues obtained from 562 men who underwent a radical prostatectomy, comparing Stat5 levels with outcome.

They also looked at prostate tumor tissue in 106 patients who were under a "watchful waiting" or active surveillance treatment plan and had no neoadjuvant therapy. Samples were taken at the time of diagnosis.

"In both cohorts, if the patient had increased Stat5 in their prostate cancer, that patient was more likely to experience prostate recurrence or die from his disease compared to patients who had very low levels of Stat5," said Dr. Nevalainen.

More specifically, patients without detectable nuclear Stat5a/b expression had recurrence-free survival of 72 percent at eight years. In contrast, patients with high nuclear Stat5a/b score had a recurrence-free survival rate of 42 percent at eight years. This indicates an approximately 30 percent benefit in recurrence-free survival at eight years associated with negative status for nuclear Stat5a/b expression in prostate cancer.

For those on active surveillance, patients with low nuclear Stat5a/b scores had a lower probability of prostate cancer specific death. There was an approximate 50 percent benefit in prostate cancer specific survival at 10 years associated with a negative status for Stat5.

The findings support a series of past and ongoing studies investigating Stat5 and its predictive capabilities led by Dr. Nevalainen.

A study from 2005, published in the journal *Clinical Cancer Research*, showed similar findings to this current study. Activated Stat5 in prostate cancer predicted outcome; however, there were differences in the cohorts. The key limitation of the previous study was the heterogeneous cohort of the patients, who received different adjuvant therapies at the time / after radical prostatectomy. In the present study, the patients received a single mode of surgical intervention with no neoadjuvant therapies.

In 2008, in a another study published in *Clinical Cancer Research*, researchers showed that they can effectively kill prostate cancer cells in both the laboratory and in experimental animal models by blocking Stat5. That provided a proof of principle that Stat5 is a therapeutic target protein for prostate cancer.

Next, the group will be investigating Stat5's predictive response after radiation therapy.

"There is an urgent need for reliable biomarkers to identify prostate cancer patients whose cancer is most likely to recur after the initial therapy and progress to advanced disease," said Dr. Nevalainen. "The data presented here supports the initiation of prospective studies to determine the clinical utility of Stat5 as a prognostic and predictive marker in prostate cancer."

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