

Prostate cancer researchers develop personalized genetic test to predict recurrence risk

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Prostate cancer researchers have developed a genetic test to identify which men are at highest risk for their prostate cancer to come back after localized treatment with surgery or radiotherapy.

The findings are published online today in *Lancet Oncology*. Study co-leads Dr. Robert Bristow, a clinician-scientist at Princess Margaret Cancer Centre, and Dr. Paul Boutros, an investigator at the Ontario Institute for Cancer Research, report that the gene test provides a much-needed quick and accurate tool to determine with greater precision the men who will do well with local [treatment](#) only (surgery or radiation), and those who will need extra treatment (chemotherapy and [hormone therapy](#)) to ensure the cancer is completely eradicated.

"Our findings set the stage to tackle the ongoing clinical problem of under-treating men with [aggressive disease](#) that will recur in 30% to 50% of [patients](#) due to hidden, microscopic disease that is already outside the prostate gland during initial treatment," says Dr. Bristow.

"This genetic test could increase cure rates in intermediate- to high-risk men by preventing progression to this metastatic spread of prostate cancer." The next step will be testing the gene signature on many more patients worldwide for three to five years to turn the test into one that is readily available in the clinic to guide personalized prostate cancer treatments.

The predictive test analyses biopsy tissue taken before treatment even starts to identify abnormal genetic characteristics (abnormal DNA) of the prostate cancer and its oxygen content. Low oxygen, or hypoxia, is an already known factor in the spread of prostate cancer. Together, this information can predict with almost 80% accuracy -

and in about three days - those prostate cancer patients who are at greatest risk of their disease returning, the study shows.

"The clinical potential is enormous for thousands of patients," says Dr. Bristow. "This is personalized cancer medicine to the hilt - the ability to provide more targeted treatment to patients based on their unique cancer genetic fingerprint plus what's going on in the cancer cell's surrounding environment. We hope to improve cure rates by reducing the chances of the cancer recurring and prevent the cells from spreading."

The researchers developed the genetic test with two groups of patients. In the first group, the team analyzed DNA from initial diagnostic biopsies of 126 men who were treated with image-guided radiotherapy (IGRT) and followed for an average 7.8 years. In the second group, the team used the test on 150 men whose tumours were removed surgically (radical prostatectomy). The genetic test produced similar results in both groups and therefore can be used in patients who choose radiotherapy or surgery as their initial treatment.

The researchers further found that when testing tumours for hypoxia in the men treated with IGRT and the gene test, this combined information made the test even more accurate, says Dr. Bristow.

The study showed that the men with the best outcomes - lower than 7% recurrence of [prostate cancer](#) at five years - had low levels of genetic changes and low hypoxia. For men with high levels of genetic changes and high hypoxia, outcomes were worse - more than 50% of patients had recurrence and these are men who, in the future, could be offered intensified treatment as part of a personalized treatment plan.

Provided by University Health Network

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