Prostate cancer researchers find genetic fingerprint identifying how, when disease spreads

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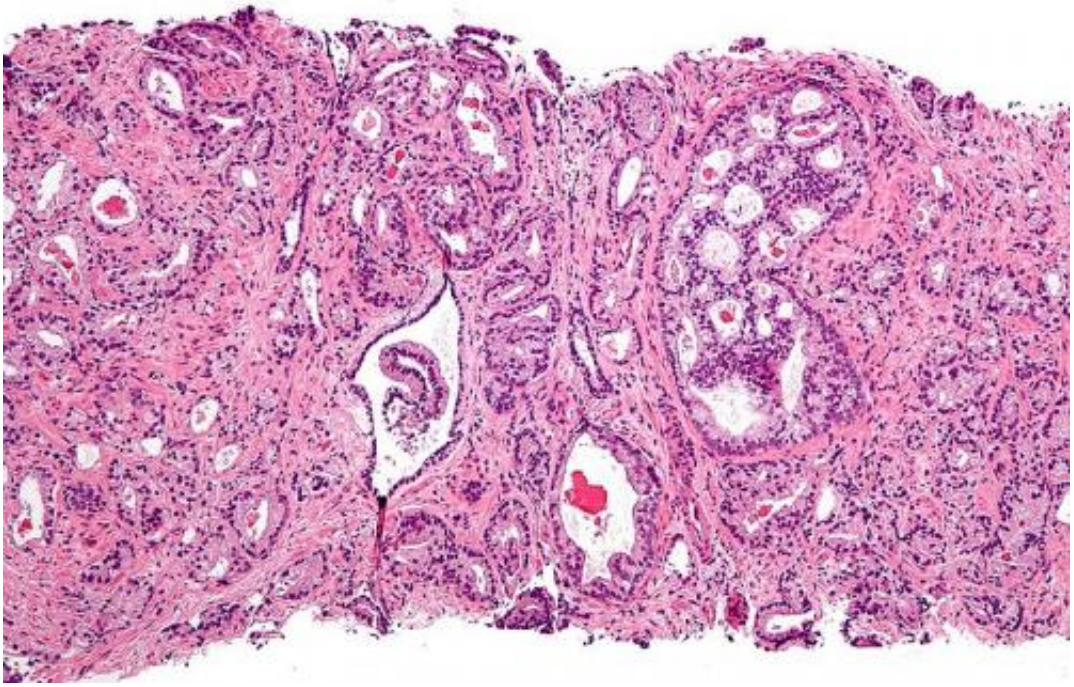

Micrograph showing prostatic acinar adenocarcinoma (the most common form of prostate cancer) Credit: Wikipedia, CC BY-SA 3.0

Canadian prostate cancer researchers have discovered the genetic fingerprint that explains why up to 30 per cent of men with potentially curable localized prostate cancer develop aggressive disease that spreads following radiotherapy or surgery.

The findings, published online today in *Nature*, could help clinicians personalize effective, targeted therapies from the moment of diagnosis, says co-principal investigator Robert Bristow, clinician-scientist at the Princess Margaret Cancer Centre, University Health Network. Dr. Bristow is also a Professor in the Departments of Radiation Oncology and Medical Biophysics, University of Toronto.

In the *Nature* study, Dr. Bristow, co-principal investigator Dr. Paul Boutros from the Ontario Institute for Cancer Research, lead author Dr. Michael Fraser, and collaborators at Laval University in Quebec City, analyzed the tumours of 500 Canadian men in the general population with localized, non-inherited prostate cancer. In a related study also published today, in *Nature Communications*, Drs. Bristow and Boutros cracked the genetic code to show why BRCA-2 inherited disease turns lethal in rare cases where men have inherited a BRCA2 gene mutation that affects the repair of DNA damage in cells.

"We used specialized state-of-the-art DNA sequencing techniques to focus on the genetics of prostate cancers to better understand what is so different from one man's disease to another man's disease," says Dr. Bristow.

"These genetic fingerprints had high accuracy in being able to discern those men who do well with surgery or radiotherapy and those men that already have early spread of their disease outside the prostate gland. This information gives us new precision about the treatment response of men with prostate cancer, and important clues as to how to better treat one set of men versus the other to improve cure rates overall."

The next step will be to translate this research finding into a molecular diagnostic tool that can be used in the clinic. Dr. Bristow says: "We will be testing 500 more men over the next two to three years to accomplish that. It is an exciting era in prostate cancer research. We will soon be

able to identify in the clinic the exact genetic state of a man's cancer and react on a patient-to-patient basis to cure more men worldwide. "

Drs. Bristow and Boutros co-lead the Canadian Prostate Cancer Genome Network (CPC-GENE), the world-leading prostate cancer sequencing program. The research published today builds on their previous published discoveries:

- first molecular portrait of localized, multi-focal prostate cancer and a new gene subgroup driving it (*Nature Genetics*, May 25, 2015);
- development of a genetic test to identify which men are at highest risk for their prostate cancer to recur after localized treatment with surgery or radiotherapy (*Lancet Oncology*, Nov 13, 2014).

Dr. Bristow says that although most men present with localized, potentially curable disease, more than 200,000 men die of it every year when tallied across all countries.

"The richness of information in our genetic findings today will enable us to further sort individual patients into appropriate groups of risk for spread of their disease and effect cures in men who otherwise might have been incurable."

More information: *Nature*, nature.com/articles/doi:10.1038/nature20788
Nature Communications, nature.com/articles/doi:10.1038/ncomms13671

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