Hybrid Gene Targets High Relapse Risk in Prostate Cancer Patients

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Differentiation will help identify patients to benefit most from treatment

Toronto, ON – In the first study to show practical applications in the treatment of prostate cancer patients of the prostate-specific fusion gene TMPRSS2:ERG, Sunnybrook researchers found expression of this hybrid gene a strong predictor of disease relapse for patients previously treated with surgery.

"To use TMPRSS2:ERG status to differentiate between patients at high risk of disease progression has significant impacts in identifying patients to benefit the most from treatment and offers opportunities for longer term development of new therapeutic interventions," says Dr. Robert Nam, co-lead investigator with Dr. Arun Seth and urologist and urologic oncologist at Odette Cancer Centre, associate scientist at Sunnybrook Research Institute and urologic oncologist and researcher at University of Toronto.

"Like the small molecule drug developed to block the production of abnormal blood cells in chronic myeloid leukemia (CML) patients, similar therapeutic interventions will be developed to inhibit prostate cancer cell production, at the molecular level, in patients with TMPRSS2:ERG gene fusion," says Dr. Arun Seth, director, molecular diagnostics/research, anatomic pathology department and senior scientist at Sunnybrook Research Institute, and a professor at University of Toronto.

The study also leads the way for research into new non-invasive methods using a patient's blood or urine samples in screening for increased risk of prostate cancer progression. These screening methods will significantly extend the arsenal of current predictors for prostate cancer progression – histologic grade (Gleason score), tumour stage and PSA (prostate specific antigen) level.

Published in this month's Cancer Biology and Therapy, the study involved 26 patients who underwent surgery for clinically localized prostate cancer. All patients had cancers of the same histologic grade (Gleason score seven) which is well established to be an aggressive form of prostate cancer. Findings indicated almost 50 per cent of these patients had tumours with TMPRSS2:ERG expression, and of that group, a highly significant 81 per cent experienced disease relapse over a five-year follow-up. The expression of TMPRSS2:ERG gene fusion (formed from the TMPRSS2 and ERG genes) is the process where the information of this hybrid gene is translated into the altered structures and functions and results in the production of prostate cancer cells.

Phase two of the study is underway with over 200 patients and to date similar effects are evident.

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About Sunnybrook Health Sciences Centre and Odette Cancer Centre

Sunnybrook Health Sciences Centre is transforming health care through the dedication of its more than 10,000 staff members who provide compassionate and innovative patient focused care.

Odette Cancer Centre (TSRCC) at Sunnybrook is one of North America's largest and leading comprehensive cancer centres providing care to over 10,000 new patients every year. TSRCC offers a full range of outpatient and inpatient treatment and supportive care programs, is a Cancer Care Ontario partner and is fully affiliated with the University of Toronto.

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