

Gene fusion discovery may lead to improved prostate cancer test

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A newly discovered gene fusion is highly expressed in a subset of prostate cancers, according to a study by researchers at Weill Cornell Medical College. The findings, reported in the April 1 issue of *Cancer Research*, may lead to more accurate tests for prostate cancer. The gene fusion biomarker is also a different type of fusion than researchers have found in cancer previously and may represent an entirely new mechanism that cancer cells use to outgrow their healthy neighbors.

The SLC45A3-ELK4 gene fusion is detectable at high levels in the urine of some men at risk for [prostate cancer](#). If these data are validated, it may be that in the future men could be tested for prostate cancer through a simple urine test. If the fusion gene is present at a high level, they likely have the disease, and if not, they likely don't have it.

"We think this is going to be a potentially important diagnostic marker in prostate cancer," says senior author Dr. Mark A. Rubin, the Homer T. Hirst Professor of Oncology in Pathology, professor of pathology and laboratory medicine, and vice chair for experimental pathology at Weill Cornell Medical College. "PSA testing is inadequate. PSA detects men with cancer but also many men with benign conditions. As we have seen recently from two major studies on PSA screening, for every 50 men with a positive PSA screening, only one man's life is saved. We urgently need biomarkers to detect clinically significant prostate cancer."

"Our work has a long-term goal of achieving a test that distinguishes clinically significant prostate cancer from indolent disease that does not require additional treatment. With better diagnosis, we will be able to treat cancer patients with individualized therapies -- one of the main goals of the Cancer Center at NewYork-Presbyterian Hospital/Weill Cornell Medical Center," continues Dr. Rubin, who is the Center's associate director of translational

research and a pathologist at NewYork-Presbyterian Hospital/Weill Cornell Medical Center.

Dr. Rubin's team is already working with a company to develop a urine test for prostate cancer using a chromosome-based gene fusion called TMPRSS2-ERG that the team discovered previously while working with members of Dr. Arul Chinnaiyan's research group at the University of Michigan. Dr. Rubin anticipates that the newly discovered SLC45A3-ELK4 gene fusion may be added to that urine test in the future to increase its accuracy and also to potentially help determine the level of response to certain non-surgical systemic treatments. The TMPRSS2-ERG urine test is being evaluated in multiple early clinical trials in the United States and Europe.

Novel Gene Fusion Sheds Light on How Cancer Works

Unlike the gene fusions previously found in cancers, which arise when two chromosomes join together in an abnormal way, the new fusion occurs when the genes are being copied into RNA. The two genes, SLC45A3 and ELK4, reside next to one another on the chromosome in normal and prostate [cancer cells](#). However, when the genes are copied into RNA in the prostate cancer cells, they frequently generate a single RNA message that fuses information from both genes. Ongoing work is exploring the potential biologic implications of this discovery. However, the diagnostic implications are more immediate because these types of genetic chimera occur at significantly higher levels in abnormal tumor cells.

"We think this type of gene fusion might be a common mechanism in cancer," Dr. Rubin says. "This expands our understanding of how tumor cells may hijack androgen-regulated genes with neighboring genes and effectively alter its regulation. This may be a way tumors gain a competitive advantage."

Source: New York- Presbyterian Hospital

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