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Researchers identify genetic root to early-onset prostate cancer

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Prostate cancer is often considered an elderly man's disease, and little is known about the approximately 2% of cases that arise in men who are aged 50 years or younger. Research published in the February 11th issue of the Cell Press journal *Cancer Cell* uncovers the genetic origin of such early-onset prostate cancer. The findings could help in the development of new diagnostic, prognostic, therapeutic, and prevention strategies for the disease.

"It's been unclear whether prostate cancer in the young is explainable by a different mechanism than prostate cancer in the elderly. Our study implicates a different cause of disease in young patients," says co-senior author Dr. Jan Korbel of the European Molecular Biology Laboratory in Heidelberg, Germany.

Dr. Korbel and his colleagues sequenced the entire genetic code of cells in 11 tumors from early-onset prostate cancer patients, comparing it with the code in tumors from 7 patients with elderly-onset prostate cancer.

The researchers found that the receptor that binds testosterone—called the androgen receptor—is very active in tumors from young patients, causing a number of genes to rearrange and become cancer promoting. The genomes of elderly prostate cancer patients primarily showed abnormalities that were not caused by the androgen receptor's activity. Data from more than 10,000 additional patients showed that androgen receptor activity and corresponding gene rearrangements were indeed higher in younger patients.

"Interestingly, young men have generally higher testosterone levels than elderly men, which raises the question of whether high physiological levels of testosterone in young men may be linked with early-onset prostate cancer, a question that we are keen to address in the future," says Dr. Korbel.

Early-onset prostate cancer requires early diagnosis and definitive treatment due to the long life expectancy of younger patients and their higher risk of dying from the disease. "We hope that our findings on the disease's cause will promote the development of new strategies to diagnose, prevent, and even individually treat this cancer," says co-senior author Dr. Thorsten Schlomm of the University Medical Center Hamburg-Eppendorf in Hamburg, Germany.

More information: *Cancer Cell,* Weischenfeldt et al.: "Integrative genomic analyses reveal androgen-driven somatic alteration landscape in early-onset prostate cancer." dx.doi.org/10.1016/j.ccr.2013.01.002

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