National Institutes of Health

Fact Sheet *Prostate Cancer Genetics*

Yesterday

- Prostate cancer was put in the category of diseases that come, unavoidably, with old age, because it was so common in older men.
- Because prostate cancer was common, scientists downplayed the idea that it could be inherited in families.
- It was first noted in 1956 that men with prostate cancer reported more family members with prostate cancer than the general population.
- Shortly thereafter, it was reported that deaths from prostate cancer were higher among fathers and brothers of men who died of prostate cancer.
- In 1992, researchers at Johns Hopkins University established a link between a family history of prostate cancer and a man's risk of developing the disease.

Today

- Researchers think that the majority of the risk for prostate cancer is from environmental factors such as smoking and diet, with genes playing a smaller role.
- About 5-10% of prostate cancer is due to the inheritance of genes that greatly increase prostate cancer risk; this condition is known as Hereditary Prostate Cancer (HPC).
- We know that men who have a father or brother with prostate cancer have a risk of developing prostate cancer three times that of the general population.
- We know that men with hereditary prostate cancer tend to develop prostate cancer far sooner – in their late 30's or early 40's – than other men.
- Using new technologies to examine the genetic makeup of families with hereditary prostate cancer, researchers supported by NIH work to identify all the genes linked to the hereditary form of the disease.
- Research shows that the genetic risk factors involved in prostate cancer may differ among families.
- In 2005, scientists discover a region on chromosome 8 that may contribute to 8-13% of prostate cancer in the general population, and 31-49% of prostate cancer among younger African-Americans.
- Men whose families carry a BRCA1 or BRCA2 gene mutation for hereditary breast cancer are found also to be at increased risk for prostate cancer.
- A study shows that a tumor suppressor gene, known as the "Deleted in Liver Cancer-1" (DLC-1) gene, is often silenced in prostate cancer. This finding may prove useful for the early detection of prostate cancer.

Tomorrow

- An NIH prevention trial is underway to assess whether specific genes are associated with cancer in patients with prostate cancer and in their siblings.
- The IMPACT study is an ongoing international study of men who are at increased risk for prostate cancer because they have a hereditary change in a gene – BRCA1, BRCA2 – that can lead to breast cancer.
- Researchers are working to develop genetic tests that can identify which men are at increased risk of developing prostate cancer prematurely.

- Scientists are developing DNA microarray technology to provide more sensitive and accurate screening tests for prostate cancer than the current prostate-specific antigen (PSA) blood test.
- The Cancer Genome Atlas project, supported by the NIH, is starting to systematically catalog mutations occurring in prostate cancer tumors.
- A better understanding of the genetic factors that increase prostate cancer risk and those that are key to tumor development and progression will lead to new ways of preventing, diagnosing, and treating prostate cancer that are tailored to individual patients – personalized medicine.

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