

## Fact sheet 5 - New developments: Prostate cancer

- **Genetics - Biomarkers**

New research on genes linked to prostate cancer is helping scientists better understand how prostate cancer develops. If we know which genetic changes lead to prostate cancer, we may be able to design medicines to reverse those changes.

An exciting new development in genetics research is the use of DNA microarray technology which allows scientists to study thousands of genes at the same time. Researchers have already identified several genes now thought to play a role in prostate cancer.

Through the use of biomarkers, which indicates a change in expression or state of a protein that correlates with the risk or progression of a disease, or with the susceptibility of the disease to a given treatment, the risk of having prostate cancer can be calculated more precisely.

The first commercially available genetic prostate cancer diagnostic test, the PCA3 test was launched a while ago. It detects a gene in urine that is over-expressed in cancerous prostate tissue. The test finds the mRNA that is specific for prostate cancer and qualifies its amount. The higher the score, the greater the probability that the patient has prostate cancer.

Other genetic tests are in the process of being approved.

In 2005, the landmark discovery was made that prostate cancer harbors gene fusions (rearrangements of genetic sequences that join genes that are normally separated) that may be the cause of this highly prevalent disease. Using a computational approach to identify cancer-causing genes from DNA microarray data, they discovered that segments of two chromosomes trade places with each other. This switch, or translocation, causes two unrelated genes to be next to each other and to fuse together. These testosterone-regulated genes called TMPRSS2 were found to be fused to a family of cancer-causing genes called ETS factors. Fusing of these genes likely causes the development of prostate cancer.

At present, research is being done into a marker that looks for gene fusion carried by a solid tumour; quite a breakthrough. Current research indicates that it may be possible to predict the risks associated with a particular prostate cancer based upon the specific gene fusion in its cells. If this work is confirmed, urologists will be able to identify those patients who need aggressive treatment and those who have benign tumours and do not need to be exposed to the risks, discomfort and complications of therapy.

- **Angiogenesis inhibitors**

Growth of prostate cancer tumours depends on growth of blood vessels (angiogenesis) to nourish the cancer cells. New drugs are being studied that may be useful in stopping prostate cancer growth by keeping new blood vessels from forming.

- **Prevention**

There are several known risk factors which can sometimes be influenced. The risk factors are:

- increasing age; the older you are, the greater the risk. All men above the age of 50 have an increased risk of prostate cancer;
- family history; if a close relative had prostate cancer your risk may be higher;
- ethnicity; among African-American men prostate cancer is more common than in Caucasian or Asian men;
- diet; a diet high in animal fat and low in fruit, vegetables and fish may increase the risk.

# Stockholm

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Researchers have not established a direct link between obesity and incidence of prostate cancer. However, obesity might affect levels of hormones related to prostate cancer risk.

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- **Vaccines**

A vaccine to treat prostate cancer, Provenge®, is available in clinical studies. It is meant to treat men whose prostate cancer has spread to other parts of the body and no longer responds to hormone therapy and is therefore considered incurable.

If approved, Provenge will become the first vaccine designed to treat existing cancer, rather than prevent the disease from occurring. To make the vaccine, a patient's own cells are combined with a protein that stimulates the immune system and causes it to attack the tumor. The treatment is customized for each patient. Doctors collect these cells from a patient's blood, mix them with the vaccine, and then give the concoction back to the patient.

In a clinical trial of 127 men, Provenge seemed to help vaccinated men live about 4.5 months longer than those given an inactive placebo treatment. However, there was no difference in how long it took for the men's cancers to begin growing again. A larger, ongoing study of Provenge is looking specifically at whether it increases longevity of prostate cancer patients.

If approved, Provenge would become the third cancer vaccine but the first that is therapeutic. The approved vaccines against liver and cervical cancer are both preventive.

If ultimately approved, Provenge would become the first of a new class of therapies designed to stimulate a patient's own immune system against cancer.