GERMAN CANCER RESEARCH CENTER
IN THE HELMHOLTZ ASSOCIATION

No. 74 September 13, 2006 (Koh)

GENOMICS AND CANCER 2006 – Conference Report I:

Prostate Cancer: Molecular Profile Expected to Secure Diagnosis and Facilitate Treatment Recommendations

Scientists of the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) and the Martini Clinic of the University Hospitals in Hamburg-Eppendorf have identified a gene activity pattern that detects prostate cancer cells at a very early stage.

An elevated value in the PSA test, a test used for the early diagnosis of prostate cancer, needs to be confirmed through a biopsy. In the tissue sample taken, a pathologist will look for malignantly transformed cells, which are a clear proof of cancer. What sounds easy in theory is often very difficult in practice. Thus, it is not rare that the thin biopsy needle misses the tiny tumor nests in the prostate tissue. In this case, the tissue sample will contain only inconspicuous cells, even though experience tells the physician that everything points to the presence of a carcinoma. However, if the pathologist has detected tumor cells, patient and doctor are faced with a difficult decision: Is the cancer aggressive and requires treatment, which is often connected with severe side effects, or is it okay to simply wait and make regular controls?

Assistant Professor Dr. Holger Sültmann of the Division of Molecular Genome Analysis at the German Cancer Research Center presents at the conference a promising approach that will make it possible to detect prostate cancer with more certainty in the future and possibly to assess its aggressiveness early on. Collaborating with Dr. Thorsten Schlomm and Dr. Olaf Hellwinkel of the Martini Clinic (Prostate Cancer Center of Hamburg University Hospitals), Sültmann and colleagues compared the gene activities of histologically inconspicuous prostate tissue portions of prostate cancer patients with the gene activity in the prostate tissue of healthy men. The investigators presumed that specific changes in the gene activity pattern of cancer sufferers may precede a histologically visible change in the prostate cancer cells. Their goal is to perform a reliable cancer diagnosis even in biopsy samples that appear inconspicuous to the pathologist under the microscope. The scientists identified a pattern of gene activities that seems to characterize a very early stage of the malignant cell transformations. The diagnostic value of this activity pattern is currently being verified in a larger group of patients. Clinical testing of the new diagnostic method is expected to start before the end of this year.

In a second study, Sültmann and his Hamburg collaborators compared the activities of genes in the tumor tissue with those in the adjacent healthy tissue of 30 prostate cancer patients and found differences in expression in 324 genes. Using mathematical and cell-biological criteria, the investigators selected twelve candidates whose activity differed most (partly up to eight times) from normal tissue. These twelve are sufficient to detect cancer reliably. A functional analysis showed that several of the twelve gene products have an influence on the invasive behavior of the tumor cells. Most of the twelve genes had not been linked to prostate cancer before.

In a next step, the researchers no longer determine the activity of their candidate genes, but quantify the proteins produced from them in the tumor cells. Using the extensive tumor tissue bank of the Hamburg hospital, the researchers are investigating whether specific changes in the levels of these proteins in the cancer cells are associated with an increased aggressiveness of the tumor – as first findings have suggested. Holger Sültmann explains: “Improvements in prostate cancer diagnostics are urgently expected. There are no reliable tests on a molecular-biological basis yet. We are still at a purely experimental stage with our

development. But we hope that the gene activity profiles will help patients and doctors in the future to make this difficult decision: Prostate cancer – monitor or treat?”

The German Cancer Research Center holds the GENOMICS AND CANCER 2006 Conference in collaboration with the National Genome Research Network (Nationales Genomforschungsnetz, NGFN), an initiative funded by the Federal Ministry of Education and Research (BMBF).

The task of the Deutsches Krebsforschungszentrum in Heidelberg (German Cancer Research Center, DKFZ) is to systematically investigate the mechanisms of cancer development and to identify cancer risk factors. The results of this basic research are expected to lead to new approaches in the prevention, diagnosis and treatment of cancer. The Center is financed to 90 percent by the Federal Ministry of Education and Research and to 10 percent by the State of Baden-Wuerttemberg. It is a member of the Helmholtz Association of National Research Centers (Helmholtz-Gemeinschaft Deutscher Forschungszentren e.V.).

This press release is available at www.dkfz.de/pressemitteilungen

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