

Genetic Test Determines Aggressiveness of Neuroblastomas

Neuroblastoma is among the types of cancer that particularly often affect children. Between one and three girls and boys in 100,000 are diagnosed with this growth of the nervous system before age 14. Scientists of the German Cancer Research Center (Deutsches Krebsforschungszentrum) and the University of Cologne have developed a method, based on the gene activity of tumor cells, for assessing the aggressiveness of neuroblastomas right at the time of diagnosis.

Neuroblastoma is unique in the sense that at least ten percent of tumors regress spontaneously without treatment, even if they have already started to metastasize. "Neuroblastoma takes a very variable course. In some cases, the tumor disappears by itself, while other patients die in spite of intensive treatment," explains Dr. Frank Westermann of the Tumorgenetics Division headed by Professor Dr. Manfred Schwab. "Using our test it will be possible to assess the individual patient's risk more accurately." This will enable scientists not only to better customize treatment to the individual case, but also to save patients with favorable prognosis the unnecessary strain of chemotherapy.

In the largest neuroblastoma study worldwide, Dr. Westermann and Dr. Benedikt Brors of the DKFZ, jointly with Dr. Matthias Fischer of Cologne University, have investigated tumor material of 251 patients. The research project was supported by the National Genome Research Network (NGFN) and the German Cancer Aid (Deutsche Krebshilfe). The scientists identified, at first in 77 tumors, 144 genes whose activity is characteristic for the course of the disease. Some of these genes are active in neuroblastomas that tend to be more malignant, while others are read more intensively in relatively benign tumors. Using a gene chip (microarray), the scientists can now study these gene activities in tumor samples and subsequently predict the further course of the disease.

The investigators tested the gene chip in another 174 tumor samples. The genetic test proved to be highly reliable: The course of the disease was predicted with 93 percent accurateness. This is substantially better than with current methods of neuroblastoma classification. In addition, the genetic test was able to filter out patients who would not have been treated according to conventional categorization, but whose disease took an unexpectedly aggressive course. In these cases, early treatment could be life-saving.

Publication: André Oberthuer, Frank Berthold, Patrick Warnat, Barbara Hero, Yvonne Kahlert, Rüdiger Spitz, Karen Ernestus, Rainer König, Stefan Haas, Roland Eils, Manfred Schwab, Benedikt Brors, Frank Westermann and Matthias Fischer: Gene Expression-Based Classification of Neuroblastoma Patients Using a Customized Oligonucleotide Microarray Outperforms Current Clinical Risk Stratification. *Journal of Clinical Oncology*, Band 24, 1. November 2006

The German National Genome Research Network NGFN was launched in 2001 by the Federal Ministry of Education and Research to research into the genetic causes of widespread diseases and to develop appropriate treatment methods. Further Information: www.ngfn.de

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., HGF).