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Joint Press Release of the German Cancer Research Center and Heidelberg University Hospitals

Individual Prognosis Through Genetic Analysis of Brain Tumor Cells

Analysis of alterations in the genetic material of ependymomas, a relatively common type of brain tumor, enables physicians to predict disease progression more precisely. A research group headed by Dr. Stefan Pfister of the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) and Heidelberg University Hospitals has presented their results in the *Journal of Clinical Oncology*.

“This finding is a step forward for the benefit of the patient,” says Dr. Stefan Pfister, who is pleased about the results jointly with his colleagues, Professor Andrey Korshunov and Dr. Hendrik Witt of DKFZ and Heidelberg University Hospitals. “Now we can develop new and individual treatment approaches for patients with biologically different ependymomas. We can use the specific alterations in the chromosomes as markers which indicate the degree of intensity needed for treating different patient groups.”

The researchers studied tumor material of 292 patients suffering from ependymoma, the second most frequent brain tumor in children. The study included only patients with established WHO tumor grades II and III. However, this ependymoma classification hardly provides any indication of how difficult treatment of the disease will be.

Surgery is the first form of treatment for ependymoma patients. It may be difficult to remove the tumor completely, since ependymomas frequently grow close to the brain stem or other vital brain structures. The traditional postoperative treatment for younger children is chemotherapy, while older children receive radiotherapy. The age limit in the study presented was four years, because detrimental late effects of irradiation on the developing brain in very young children were feared.

The researchers studied the tumor cells removed, comparing them with healthy cells. They found characteristic alterations in the chromosomes, the carriers of genetic material, of the brain tumor cells. They regularly found gains or losses of whole chromosomes or chromosome regions. The investigators proceeded to compare the prognostic value of these aberrations with respect to survival with known prognostic factors. These include recurrence of disease, age at diagnosis, gender, position of tumor in the brain, WHO tumor grade and whether or not it was possible to remove the tumor completely by surgery.

The researchers found out that, besides a young age at diagnosis, the knowledge of individual alterations in the genetic material of tumor cells facilitates very accurate predictions about disease progression. Thus, gains on the long arm of chromosome 1 as well as the loss of tumor-suppressing genes are associated with a rather poor response to treatment so that it is important to find new or additional treatment options for these patients. On the other hand, complete loss of chromosome 6 or gains on chromosomes 9, 15 or 18 were associated with longer survival of the patients. Further investigations will show whether doctors may spare these patients some stressful treatments.

A picture for this press release is available on the Internet at:
www.dkfz.de/de/presse/pressemitteilungen/2010/images/Pfister_homozygous_deletion.jpg

Picture caption: Fluorescence image of cells of a high-risk brain tumor (ependymoma). Scientists recognize a loss of genetic material because there are only single red and green dots. In a healthy cell, two signals of each color (= 2 copies of each specific DNA) would be expected.

Literature:

A. Korshunov et al: Molecular Staging of Intracranial Ependymoma in Children and Adults. J Clin Oncol 28. DOI:10.1200/JCO.2009.27.3359

The German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) is the largest biomedical research institute in Germany and is a member of the Helmholtz Association of National Research Centers. More than 2,200 staff members, including 1000 scientists, are investigating the mechanisms of cancer and are working to identify cancer risk factors. They provide the foundations for developing novel approaches in the prevention, diagnosis, and treatment of cancer. In addition, the staff of the Cancer Information Service (KID) offers information about the widespread disease of cancer for patients, their families, and the general public. The Center is funded by the German Federal Ministry of Education and Research (90%) and the State of Baden-Württemberg (10%).

**Heidelberg University Hospitals and Medical Faculty of Heidelberg University
Patient Care, Research and Teaching of International Standing**

Heidelberg University Hospitals is among the largest and most renowned medical centers in Germany. The Medical Faculty of Heidelberg University ranges among the internationally relevant biomedical research institutes in Europe. The common goal is to develop new therapies and to apply them rapidly for the benefit of the patient. Hospitals and Faculty have approximately 10,000 employees and are active in training and qualification. In more than 40 clinics and special departments with about 2,000 hospital beds, approximately 550,000 patients receive inpatient and outpatient treatment each year. There are currently about 3,400 aspiring doctors studying medicine in Heidelberg; the Heidelberg Curriculum Medicinale (HeiCuMed) is at the top of medical teaching and training in Germany.

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

Dr. Stefanie Seltsmann
Head of Press and Public Relations
German Cancer Research Center
Im Neuenheimer Feld 280
D-69120 Heidelberg
Phone: +49 6221 42 2854
Fax: +49 6221 42 2968
presse@dkfz.de

Heidelberg University Hospitals
Dr. Annette Tuffs
Head of Press and Public Relations of
Heidelberg University Hospitals and the Medical Faculty of Heidelberg University
Im Neuenheimer Feld 672
D-69120 Heidelberg
Phone: +49 6221 56 45 36
Fax: +49 6221 56 45 44
E-mail: Annette.Tuffs@med.uni-heidelberg.de
www.klinikum.uni-heidelberg.de