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GENOMICS AND CANCER 2006 – Conference Report II:

Tracking down Metastases

Scientists at the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) are systematically screening unknown gene products for cancer-relevant properties and have come across a protein that acts as a brake on metastasis. Researchers of the University of Utrecht, Netherlands, have identified a pattern of gene activities that indicates whether tumors of the oropharynx have already spread cancer cells to the lymph nodes.

The decoding of the human genome has produced countless genes coding for proteins whose tasks and functions within the cell are totally unknown. Assistant Professor **Dr. Stefan Wiemann**, Division of Molecular Genome Analysis at the DKFZ, reports about the development of systematic test series to facilitate large-scale testing of unknown proteins to determine their cellular functions. These tests primarily analyze properties that are linked to the development and spread of cancer. This includes, for example, DNA replication, interactions with molecules regulating programmed cell death, or the ability to invade neighboring tissues. The Heidelberg scientists make the data from these test series available for colleagues throughout the world in an Internet database (http://www.LIFEdb.de). The goal of the systematic search is to identify proteins that play a key role in the disease process and, thus, may be used as targets for new treatments or as markers for diagnosis.

One of the proteins that Wiemann and his team found during their search is Vmp1. The protein is involved in the formation of cell-cell contacts. These contact sites normally make sure that a cell is anchored firmly in the tissue. If Vmp1 production is reduced, the cell breaks away from its cell aggregate and can start invading neighboring tissues. As the scientists had expected, Vmp1 production is significantly reduced in various cancer cell lines. This is why Wiemann has called Vmp1 a “metastasis opponent”. He expects that a detailed analysis of the protein’s functions will help to further elucidate the complex process of metastasis.

Metastases, i.e. secondary tumors spread from the primary tumor site to other places in the body, pose the biggest threat in most cancers. In tumors of the head and neck, metastasis is frequently preceded by a colonization of regional lymph nodes by cancer cells. The complex anatomy of this body region makes it almost impossible for doctors to find the tiny tumor nests. **Professor Dr. Frank Holstege** of the University of Utrecht, Netherlands, and his team have developed a method for detecting the presence of metastatic tumors of cancers of the oral cavity in the lymph nodes using the gene activity of cells of the primary tumor. Holstege discovered that the gene activity patterns of metastasizing and non-metastasizing tumors show typical differences.

The diagnostic value of this gene signature is currently being assessed in a clinical trial using a large number of tumor tissue samples. Final results are expected in about two years time. First evaluations have found no false positive results – a must for patient safety. If the new analysis method passes the test in practice, it might save many patients from undergoing unnecessary and stressful surgical removal of lymph nodes in the neck region .

The German Cancer Research Center organizes 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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