

Gene Test to Detect Estrogen Receptors in Breast Cancer Cells

In breast cancer, the detection of hormone receptors is key for choosing the right treatment. A novel test on the basis of gene analysis has been developed by scientists of the German Cancer Research Center (Deutsches Krebsforschungszentrum , DKFZ) in collaboration with colleagues from Graz, Austria, and Munich.

Breast cancer cells often depend on growth hormones such as estrogen. The hormones tell the cell to divide, thus promoting tumor growth. Hormone receptors on the surface of tumor cells are a reliable indicator of a hormone-sensitive tumor. Therefore, it is a routine procedure to check for estrogen and progesterone receptors in tumor tissue. If receptors are detected, an antihormone therapy – such as with tamoxifen – may reduce the risk of recurrence in affected women.

Accurate determination of hormone receptors is crucial for the choice of treatment. Studies have shown, however, that results vary from one laboratory to the other. A research group headed by **Assistant Professor Dr. Holger Sültmann** of the Division of Molecular Genome Analysis, under the leadership of **Professor Annemarie Poustka**, has now developed a gene test for reliable detection of estrogen receptors. The test analyzes the activity of no more than ten marker genes.

The current standard is a histopathological examination based on the assessment of stained tumor tissue under the microscope. Evaluation depends on the experience of the microscopist and hence is error-prone. Because of the low sensitivity of the staining method, small amounts of estrogen receptors often remain undetected. Studies have shown, however, that even these cells respond to antihormone therapy. Moreover, the conventional test method detects the presence of a single protein, while the gene test is aimed at several components of the signaling pathway in the cell and, thus, is a better reflection of the actual activity of hormone receptors.

The gene signature has been tested in 257 tumor samples from three different scientific studies and has proven to be just as reliable as the histopathological examination. Further advantages of the method are that it can be standardized and that it is an objective form of analysis. Therefore, Sültmann believes that the gene activity test has good chances of being introduced into clinical diagnostics.

Jörg Schneider, Markus Ruschhaupt, Andreas Buneß, Martin Asslaber, Peter Regitnig, Kurt Zatloukal, Walter Schippinger, Ferdinand Ploner, Annemarie Poustka, and Holger Sültmann: Identification and meta-analysis of a small gene expression signature for the diagnosis of estrogen receptor status in invasive ductal breast cancer. *International Journal of Cancer*, DOI: 10.1002/ijc.22234

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).

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

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