



UniversitätsKlinikum Heidelberg



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

### The Road to Individualized Tumor Vaccines

**What are the typical cancer cell characteristics that our immune system is directed against? Using a new biochemical method, scientists of the Neurosurgery Department of Heidelberg University Hospitals and the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) are now able to answer this question for each individual patient. The method is expected to help identify new target structures for individualized tumor vaccines.**

Scientists are developing ever more sophisticated methods to support our body's own immune system in its fight against cancer. However, patients suffering from the same type of cancer have different repertoires of immune cells. Therefore, doctors are taking an individualized approach to immune therapy: Immune cells are obtained from a patient and activated against the cancer in the culture dish using their "matching" tumor proteins called antigens. Then they are returned to the patient by injection in order to make the immune system's battle against tumor cells more effective.

To this end, doctors first need to know the exact protein characteristics of a tumor which a patient's immune cells are directed against. Working groups headed by Christel Herold-Mende of the Neurosurgery Department of Heidelberg University (Medical Director: Prof. Andreas Unterberg) and Philipp Beckhove of the German Cancer Research Center have now tested a new method to find out. By combining two different chromatography methods, the researchers first fractionated the whole protein mixture from a tumor tissue sample into individual components. Subsequently, they studied the individual protein components in the culture dish to find out whether they can activate immune cells taken from a patient's blood.

The new method enabled the Heidelberg scientists to identify several proteins in a malignant brain tumor which had not yet been known as tumor antigens and which may serve as targets of an immune response against cancer. Four of ten other astrocytoma patients examined were also found to have immune cells directed against the newly discovered tumor antigens. For the scientists, this was an indication of the clinical relevance of their results.

The investigators were surprised to find that two of the newly discovered antigens are produced not only by the brain tumor cells themselves but also by what is called tumor stroma – the medical term for the tissue which surrounds a tumor and closely interacts with the cancer cells. "We know by now that the cancer can cause production of particular proteins in the stroma cells," says Philipp Beckhove. "The tumor depends on its surroundings. If we hit the stroma, the cancer will perish, too – that is a whole new approach in cancer treatment."

Christel Herold-Mende envisions numerous ways of using the new protein fractionation method. It is faster and less costly than previously available methods and it also isolates the antigens of the tumor stroma during the same testing run. Another important aspect for clinical use is the fact that it identifies tumor antigens for the different classes of immune cells.

A picture for this press release is available on the Internet at:

<http://www.dkfz.de/de/presse/pressemitteilungen/2010/images/immunzellen.jpg>

Picture legend: Scanning microscopy image of immune cells

Picture source: German Cancer Research Center

Philipp Beckhove, Rolf Warta, Britt Lemke, Diana Stoycheva, Frank Momburg, Martina Schnölzer, Uwe Warnken, Hubertus Schmitz-Winnenthal, Rezvan Ahmadi, Mariana Bucur, Simone Jünger, Thomas Schueler, Volker Lennerz, Thomas Woelfel, Andreas Unterberg and Christel Herold-Mende: Rapid T-cell based identification of tissue antigens by automated two-dimensional protein fractionation. Journal of Clinical Investigations 2010, DOI:10.1172/JCI37646

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