

Fighting Cancer with Defense Cells

The world's leading experts in the fields of immune therapy and defects of the body's own immune defense will be sharing their knowledge at an international symposium held at the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) on November 19-20, 2009.

It has been experimentally established for quite some time that our body's own immune system is able to kill cancer cells. Therefore, scientists have been trying for some years now to stimulate immune cells specifically so that they directly attack cancer. However, the complexity of the immune system with all its cell types, signaling molecules and regulatory mechanisms is an obstacle to simple solutions. In order to develop successful immune therapies, we must understand the details of the complicated rules of immune defense. At the "International Symposium on Immunotherapy and Immunodeficiency" at DKFZ, about 50 of the world's leading experts will be sharing the latest results, which are expected to contribute substantially to advancing cancer treatment with immune cells.

A specific population of the immune system's T cells is responsible for ensuring that the immune cells normally do not direct themselves against the body's own structures. Shimon Sakaguchi of Kyoto University found out that these regulatory T cells ("Tregs") also determine whether a tumor is attacked or "overlooked" by the immune system.

DKFZ's Philipp Beckhove is also studying regulatory T cells. If these cells are activated by a tumor's protein characteristics, they prevent other immune cells from attacking the cancer cells. Beckhove discovered in bowel cancer that the Tregs can only be activated by specific protein components of the cancer cells. In contrast, those immune cells which start fighting the tumor respond to a broader range of cancer proteins. To prevent that Tregs stifle the effect of immunotherapy from the beginning, Beckhove suggests specific use of those protein characteristics of the cancer cell that can activate the immune cells, but not the Tregs.

Cellular immune therapies involve a huge effort: Every patient has only a few tumor-specific immune cells. They need to be gathered and prepared for their use against cancer in a culture dish. Therefore, Philip Greenberg of the Fred Hutchinson Cancer Research Center in Seattle is trying to use gene therapy to equip a patient's normal T cells with receptor molecules which give them specificity against the protein characteristics of the tumor. This might eliminate the need for the time-consuming search for a patient's own cancer-specific immune cells.

Many gene therapy trials are aimed at altering the function of the immune system. At the NCT Heidelberg and DKFZ, Christof von Kalle is investigating for each trial participant individually which immune cells have been influenced by the therapy and what the long-term effects on the immune system are. This knowledge already helps to increase the effectiveness and safety of ongoing and future treatments.

Richard O'Reilly of the Memorial Sloan Kettering Cancer Center in New York is trying to help leukemia patients who often suffer from life-threatening fungal or viral infections after receiving a bone marrow transplant. In a culture dish, he generates T cells which recognize the respective pathogen specifically. Early clinical trials have already shown that such pathogen-specific immune cells are able to contain infections effectively.

The symposium held by the Helmholtz Alliance "Immunotherapy of Cancer" and the National Center for Tumor Diseases (NCT) Heidelberg will take place on 19th and 20th November 2009 at the Communication Center (Kommunikationszentrum) of DKFZ. Journalists are welcome to attend.

A picture for this press release is available at:

<http://www.dkfz.de/de/presse/pressemitteilungen/2009/images/Dendrit.jpg>

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 2,000 staff members, including 850 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%).

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