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Modified Immune Therapy To Prolong Cancer Patients' Lives

Danger signs help to recognize tumors

A type of virus called Newcastle Disease Virus (NDV) may be put to useful service in the fight against cancer. Professor Volker Schirrmacher, head of the Division of Cellular Immunology at DKFZ, has achieved promising results with virus-modified immune therapy. In several studies including over 200 cancer patients, 28.5 percent of patients who received immune therapy showed improved long-term survival compared to a control group without immune therapy.*

Schirrmacher and his colleagues have been testing a type of immune therapy based on what is called a tumor cell vaccine. This means that tumor cells are obtained from a patient, multiplied in cell culture and then infected with NDV. NDV is a bird virus that is harmless for humans. It multiplies selectively in cancer cells, inhibits tumor growth and stimulizes the immune system. Such infected tumor cells were inactivated through irradiation and injected just under the patients' skin. The idea is to present tumor-specific antigens to the immune system and, at the same time, have components such as viral double-strand RNA act as danger signs. Researchers hope that tumor antigens and viral components jointly produce a learning effect in the immune system. Next time when tumor antigens occur, the body's own defense should be able to recognize this as a danger sign and trigger a cascade of multiple immune reactions against the tumor.

Schirrmacher and clinical colleagues were able to show that this concept works through studies performed over several years with patients affected by various types of cancer including colorectal, renal, breast and skin cancers. A recent pilot study conducted by Schirrmacher in collaboration with Dr. Jochen Karcher, Dr. Gerhard Dyckhoff and colleagues at Heidelberg University Hospitals headed by Dr. Christel Herold-Mende, has confirmed these results once more. Of 18 patients with advanced head and neck tumors treated by surgery, 61 percent of patients were still alive five years after receiving immune therapy – compared to 38 percent after standard treatment.

The success of this therapy is probably due to the fact that the body's own immune system has recognized tumor cells as "non-self" at an earlier point. Even though this contact was not sufficient to keep the cancer under control, the immune system was apparently able to form what are called memory cells. The fact that these memory T cells can easily be reactivated proves to be very favorable for immune therapy. At the same time, side effects are limited: Occasionally patients suffered from headaches or slight fevers.

Direct comparisons with treatments using other tumor vaccines are not possible, because in many earlier studies the effectiveness of the treatment has been evaluated based on tumor response rate, i.e., whether the treatment has stopped tumor growth or caused the tumor to shrink. Today, however, it is known that this does not necessarily go along with improved survival. Volker Schirrmacher, therefore, has no doubts about his own study concept: "There can hardly be a question about what is more important for a patient: tumor response rate or improved long-term survival."

*"Clinical trials of antitumor vaccination with an autologous tumor cell vaccine modified by virus infection: improvement of patient survival based on improved antitumor immune memory", Volker Schirrmacher, Cancer Immunol Immunotherapy; Oct. 2004;DOI 10.1007/s 00262-004-0602-0 (springerlink.com)

** Antitumor vaccination in patients with head and neck squamous cell carcinomas with autologous virus-modified tumor cells. Cancer Research, 2004 Nov 1;64(21):8057-61.

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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