

## **Interferon Attracts Killer Cells to Tumors**

**Natural killer cells are part of our body's own immune defense against cancer. Scientists of the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) have found the factors that cause immune cells to accumulate in tumors. Gamma interferon, an immune messenger substance, can be used to direct NK cells specifically into cancer tissue.**

Natural killer cells, or NK cells for short, are an important component of the innate immune system. Unlike the immune system's T cells, which need to recognize specific cell structures to become active, NK cells are always ready for action. They selectively eliminate body cells that have lost their molecular 'proof of identity', the MHC class I molecule. This happens during viral infections or cell transformation leading to cancer.

Therefore, NK cells are regarded as an important line of defense of our body against cancer. Numerous studies have confirmed that cancer patients whose tumors reveal plenty of NK cells have a particularly good prognosis. Dr. Adelheid Cerwenka and her team at DKFZ have now performed research in mice to find out which factors are responsible for NK cell accumulation in tumors.

The investigators have shown that an immune protein called gamma interferon (IFN- $\gamma$ ) plays a pivotal role. Mice survive transplantations of lymphatic or skin cancer cells for 25 days on average. However, if cancer cells are transplanted into mice and IFN- $\gamma$  is switched off at the same time, the animals die earlier and their tumors contain less NK cells. The immunologists also found out that the immune protein's effect on NK cells is an indirect one. Gamma interferon in a tumor apparently stimulates production of another signaling molecule. This substance, called CXCL10, specifically attracts NK cells revealing the matching receptor on their surface to the tumor tissue. The more signaling molecules are produced in the tumor, the more NK cells accumulate in the cancer tissue and the longer are the mice able to survive.

From a medical point of view it is particularly interesting that this effect can be influenced "from outside". Thus, NK cells are also attracted if mice are injected biotechnologically produced gamma interferon or CXCL10 into the tumor. "This makes the result so exciting," says study head Adelheid Cerwenka, "because this may enable us to support tumor treatments by setting natural killer cells on the cancer."

Marco Wendel, Ioanna E. Galani, Elisabeth Suri-Payer and Adelheid Cerwenka: Natural Killer Cell Accumulation in Tumors Is Dependent on IFN- $\gamma$  and CXCR3 Ligands  
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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.).