Iron induces death in tumor cells

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Rapid growth of cancer cells and their frequent divisions have their price: Cancer cells need considerably more energy than healthy cells. Their metabolism runs at full speed and requires large amounts of micronutrients, particularly iron. However, high levels of iron in the cell lead to the production of extremely harmful free radicals. To protect itself from these, the cell inactivates free iron by binding it to what are called iron storage proteins.

Collaborating with physicians of the Dermatology Department of Mannheim University Hospitals, Dr. Karsten Gülow and Professor Dr. Peter Krammer, head of the Division of Immunogenetics at DKFZ, investigated Sézary's disease (also called Sézary syndrome), an extremely aggressive type of cutaneous T cell lymphoma. The majority of currently available treatments are not really effective against this fatal type of cancer.

Using a molecular-biological trick, Gülow and colleagues succeeded in blocking the production of one of the iron storage proteins in lymphoma cells. This leads to a rise in the level of free, non-bound iron in these cells. The iron boosts the production of free oxygen radicals which cause oxidative stress and, thus, cause damage to the cancer cells and induce their death. Healthy cells with their low iron level, however, survive the treatment unharmed.

The DKFZ researchers have already found evidence that this iron effect also works in other lymphomas. They are now investigating whether selective release of iron may be a suitable approach for developing a

novel cancer treatment.

More information: Michael K. Kiessling, Claus D. Klemke, Marcin M. Kamiński, Ioanna E. Galani, Peter H. Krammer, and Karsten Gülow: Inhibition of constitutively activated NF-κB induces ROS- and iron dependent cell death in cutaneous T cell lymphoma. *Cancer Research* 2009; DOI:10.1158/0008-5472.CAN-08-3221

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