

Improved Treatment of Liver Metastases – Cancer Prize Awarded to Heidelberg Scientist

Dr. Lena Maier-Hein of the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) is awarded with the 2008 Waltraud Lewenz Prize for developing a computer assisted targeting system that brings substantial improvements to the treatment of cancer metastases in the liver. The system enables surgeons to precisely locate a tumor in minimally invasive surgery through a small incision in the abdominal area. This will make it possible to treat patients more gently in the future.

In many common cancers, tumor cells migrate through the lymphatic system into the liver where they grow into metastases. For the treatment of these secondary tumors, heat is frequently used. When planning this kind of minimally invasive intervention called thermal ablation, surgeons determine exactly where they need to insert their fine, needle-like instruments so as to target the tumor. During the procedure, they only have two-dimensional CT scans for navigation. The liver is in constant motion due to breathing and heart beat and, in addition, the instruments employed by the surgeon cause deformation of the soft liver tissue. These two factors make it even more difficult to precisely hit target structures straight away without damaging, for example, important blood vessels.

In her doctoral thesis at the Division of Medical and Biological Informatics of DKFZ, **Dr. Lena Maier-Hein** tackled this problem. The result of her research is a computer assisted positioning system which calculates the exact position of the tumor in real time and indicates the ideal insertion place and angle on a monitor to enable surgeons to hit the tumor at the first try while sparing important hepatic structures as much as possible.

The trick behind Maier-Hein's invention are needles used as navigation aids which are placed in the vicinity of the metastasis prior to a CT scan. Thus, they are visible on the CT images. During the intervention, a stereo camera traces the movement of the outside tips of these needles. The tumor location is then calculated based on their position.

To validate the new targeting system, Maier-Hein and her co-workers developed a torso model by which respiratory motion can be simulated in organs of slaughtered animals. Since the scientists used material from animals that were killed anyway, they needed only a minimum of animal experiments. Lena Maier-Hein's development, which will soon be tested in the operation room, promises a more gentle treatment of liver metastases in the future.

Lena Maier-Hein, born in 1980, studied Computer Sciences at the University of Karlsruhe and graduated with distinction in 2005. Her scientific achievements during her university studies and in her diploma and doctoral theses have been acknowledged by numerous awards. Several patents have been granted for the inventions from her doctoral thesis.

It is the third time that the German Cancer Research Center awards the Waltraud Lewenz Prize, which is worth 7,500 Euros this year. Waltraud Lewenz was a high school teacher in Wiesbaden, Germany, and with her bequest supported the DKFZ Research Programs "Cancer Risk Factors and Prevention" and "Diagnostics and Experimental Therapy". In addition, she donated the prize to be awarded every two years for excellent scientific achievements in the above mentioned research areas.

The award will be presented on Tuesday, July 21 at the German Cancer Research Center.

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%).

Contact:

Dr. Stefanie Seltmann
Presse- und Öffentlichkeitsarbeit
Deutsches Krebsforschungszentrum
Im Neuenheimer Feld 280
D-69120 Heidelberg
T: +49 6221 42 2854
F: +49 6221 42 2968