

Healthcare industry BW

Robot analysis of tissue sections

The "NanoZoomer" robot at the TIGA High-Tech Imaging Centre at the University of Heidelberg delivers high-resolution images of cells and tissues and analyses them completely automatically.

The new TIGA High-Tech Imaging Centre at the University of Heidelberg, which was founded together with the Japanese company Hamamatsu, allows new insights into cells and tissues: For the first time ever, a high-tech robot enables pictures to be taken of tissue sections in the millionth of a millimetre range and analyse them – and all that completely automatically. This will be of great benefit for researchers dealing with cancerous diseases and investigating in detail the effects therapies have on cells and tissues.

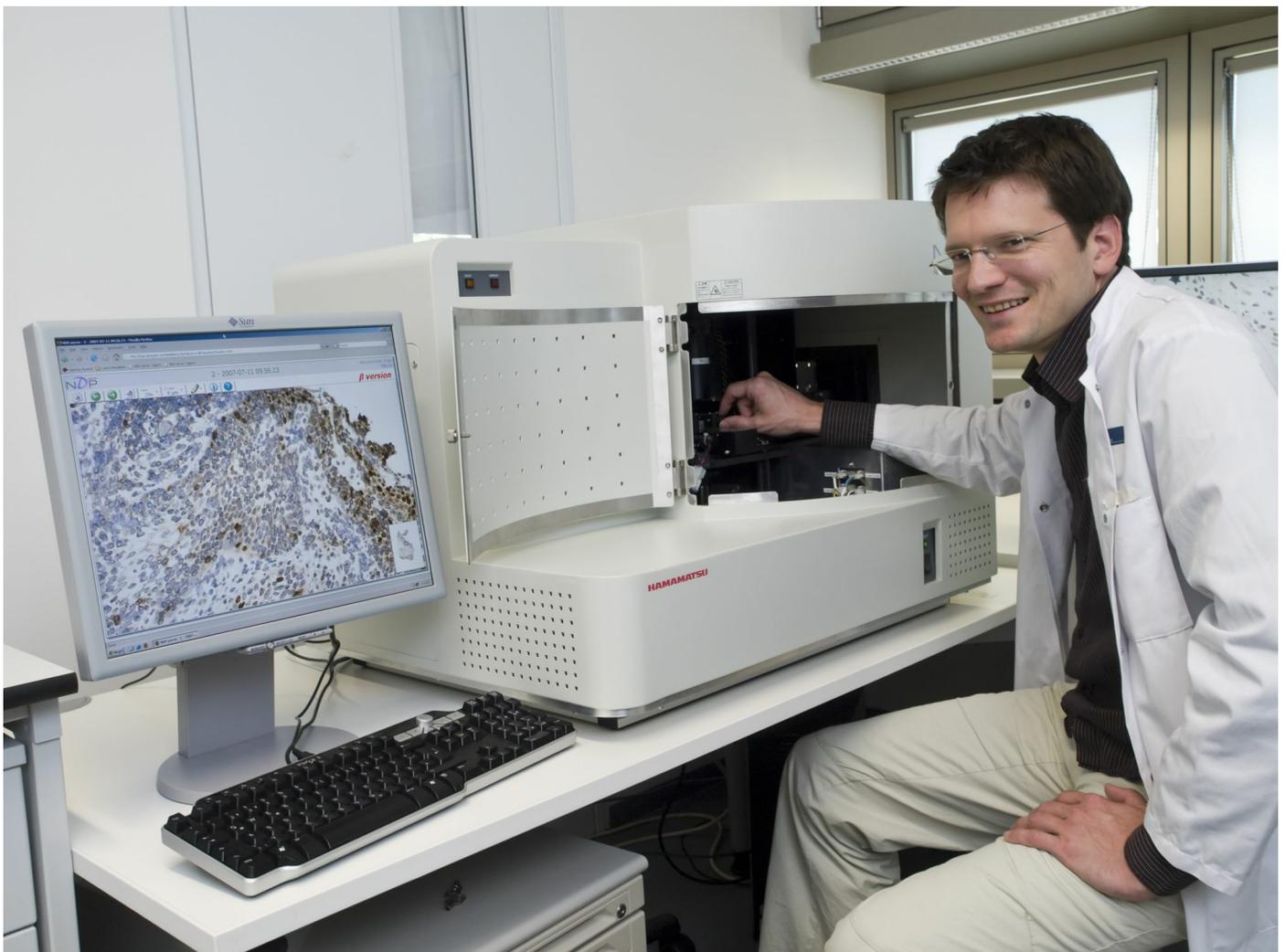
TIGA – cooperation between university and industry

The Hamamatsu Tissue Imaging and Analysis (TIGA) Centre is a cooperative venture of the Institutes of Pathology and Medical Informatics and Biometry at the University Hospital of Heidelberg and the Japanese company Hamamatsu Photonics. The Centre is also part of BIOQUANT, a research centre dealing with quantitative biology at the University of Heidelberg. At TIGA's core is the NanoZoomer, an imaging robot manufactured by Hamamatsu Photonics that scans tissue sections at different levels to create virtual slides that can then be viewed at different focal planes.

"The fully automatic analysis of tissue alterations and targets for new therapies has come within technical reach," explains Professor Dr. Peter Schirmacher, Director of the Institute of Pathology at the University Hospital Heidelberg. This would be a new milestone in pathology."

Detailed scans enable a deeper understanding of diseases

Which proteins are produced in larger quantities by cancer cells? How does tumour tissue change during radiation therapy? Thanks to high-resolution images of the NanoZoomer and the analysis of the images with specific programmes, researchers are able to assess tissue and cell preparations more rapidly and more reliably as well as gain new information on how to adapt therapies to the individual requirements of patients (for example those suffering from breast cancer).



Dr. Niels Grabe, head of science of the TIGA Centre, working with the "NanoZoomer" that enables the fully automatic analysis of tissue scans. (Photo: University Hospital Heidelberg)

In future, the robot will also be able to identify cell and tissue alterations fully automatically. "The NanoZoomer represents a quantum leap in tissue research," said Dr. Niels Grabe from the Institute of Medical Informatics and Biometry and scientific leader of the TIGA Centre.

Virtual tissues are produced from large amounts of data

The medical computer experts use the NanoZoomer to analyse huge amounts of tissue data and use the information for basic research. For example, Dr. Niels Grabe and his team are using the data to prepare virtual skin tissue. "We use a computer model of human skin tissue to test whether certain substances are toxic," said Dr. Grabe adding that "this might, in future, make the search for potential active drug ingredients a lot easier."

Hamamatsu realised the broad potential of the NanoZoomer very early, and is now able to tap new technological markets. "We are happy to be working together with the Institute of Pathology and the Institute of Medical Biometry and Informatics. These two partners enable us to investigate concrete clinical uses and new applications in research jointly," said Hideo Hiruma, Managing Director of Hamamatsu Photonics, Japan.

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