

Combination of Imaging Methods Improves Diagnostics



Researchers in Germany have succeeded in a breakthrough for the further development of contrast agents and consequently improved diagnostics with imaging using MRI (magnetic resonance imaging) procedures. Using a new technique called imaging mass spectrometry (MALDI-MS imaging), they were able to determine the tissue-related kinetics of the contrast agent used in a myocardial infarction model. The data show how the contrast agent acts in healthy and damaged heart tissue.

The new method serves to improve the use of imaging in the diagnostic process, according to researchers from the Helmholtz Zentrum München and the Technische Universität München. Results of the study are published in the "*Angewandte Chemie International Edition*" journal.

MRI offers a high-resolution procedure for the diagnostic imaging of patients. Often this procedure additionally uses contrast agents that clarify certain tissue structures and pathological processes. However, the image signal that is generated in the MRI does not correlate with the actual quantitative concentration of contrast agent in the tissue.

The researchers, led by Prof. Dr. Axel Walch and Dr. Michaela Aichler from the Helmholtz Zentrum München, developed the MALDI-MS imaging technique to make it possible specifically to measure contrast agent concentrations. This new technique enabled the research team to obtain quantitative data on the gadolinium-based contrast agents in the tissue and also in establishing a corresponding correlation with the MRI image.

MALDI-MS imaging is a form of molecular imaging in tissues at a microscopic level. Using the mass signals, it can detect and localise a wide range of molecules, such as proteins, lipids and components of cell metabolism, as well as substances and their metabolites in tissue sections.

The researchers worked with scientists headed by Dr. Moritz Wildgruber from the Technische Universität München's Klinikum rechts der Isar to conduct the successful testing of the new technique.

The procedure is already being used at the Helmholtz Zentrum München and in industry for research into active substances, the research team says.

The current study has now made MRI contrast agents available as a new class of molecules for this method. "By precisely and quantitatively registering the histological distribution of contrast agents, we can make a crucial contribution to the further development and improvement of these substances," Prof. Walch explains.

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