7-Tesla MRI scanner allows even more accurate diagnosis of breast cancer

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Taking part in a recent study, scientists at the MedUni Vienna have demonstrated for the first time worldwide that 7-Tesla ultra-high-field magnetic resonance imaging (MRI) can be used for clinical applications in patients with breast tumours. This may in future facilitate even more accurate diagnosis of breast cancer. The scientists' work has now been published in the highly respected journal "European Radiology".

In previous studies involving 7-Tesla MRI, the exploration of clinical application has previously been limited to just one breast due to the limited coil technology available. "The new generation of coils allows

[clinical application](#) on both sides," explains Katja Pinker from the University Department of Radiology and Nuclear Medicine, Department of Molecular Imaging at the MedUni Vienna (headed up by Thomas Helbich), which carried out the study in collaboration with the High Field MR Centre of Excellence (headed up by Siegfried Trattnig) and the Breast Health Centre at the MedUni Vienna and Vienna General Hospital (Coordinator Michael Gnant).

Personalised diagnosis with increased diagnostic accuracy

The 7-Tesla MRI scanner permits a high [diagnostic accuracy](#) of 96.6 per cent. Says Pinker: "The higher signal available with 7T permits a higher resolution, allowing fine details to be visualised better and a more certain diagnosis to be made. Diagnosis at molecular and metabolic level is also possible with diffusion-weighted or sodium imaging and spectroscopy, helping us to characterise tumours even more effectively."

The general outcome of the study was that bilateral ultra-high-field MRI of the breast with 7-Tesla can be used clinically without problems and "allows patients with breast tumours to be diagnosed more accurately", says the MedUni Vienna expert. "The future enhancement of ultra-high-field MRI of the breast with 7-Tesla using molecular and metabolic imaging could represent a further step towards personalised medicine, since not every type of [breast cancer](#) is the same."

By way of comparison, the current clinical standard MRI scans using a 3-Tesla device yield a diagnostic accuracy, with the very best equipment, of up to 93 per cent. The duration of the investigation is also the same, whether it be a 3-Tesla or 7-Tesla scanner. The patient spends just over fifteen minutes in the tunnel.

Five years of 7-Tesla MRI at the MedUni Vienna

The clinical use of 7-Tesla in the examination of breast tumours is therefore possible immediately, however it also depends on the availability of suitable equipment: worldwide there are only eight university organisations that have a 7-Tesla device, including one at the MedUni Vienna / Vienna General Hospital. The 7-Tesla MRI scanner has been around for five years at the MedUni Vienna, and it is the only device of its kind in Austria. The Centre of Excellence for High Field MR is one of the world's leading facilities for this technology.

More information: "Clinical application of bilateral high temporal and spatial resolution dynamic contrast-enhanced magnetic resonance imaging of the breast at 7 T." Pinker K, Bogner W, Baltzer P, Trattnig S, Gruber S, Abeyakoon O, Bernathova M, Zaric O, Dubsky P, Bago-Horvath Z, Weber M, Leithner D, Helbich TH. *Eur Radiol*. 2013 Dec 5. [Epub ahead of print].

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