Magnetic Resonance Contrast Imaging of Magnetoferritin

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It is believed that a precursor of pathological iron accumulation in human body is ferritin, which is normally poorly detected by MRI. However, pathological ferritin is associated with structural changes that should increase the hypointensive artefacts in MRI. On the basis of recent findings in respect to the pathological ferritin structure, we prepared the magnetoferritin particles as a possible pathological ferritin model system. The particles were characterised with DLS, as well as with SQUID measurements. With the help of low-field (0.2 T) and high-field (4.7 T) MRI systems we found that it is possible to clearly distinguish between native ferritin as a physiological model system, and magnetoferritin as a pathological model system. The T2-weighted STIR protocol at 0.2 T showed the optimum contrast differentiation. Such findings are highly promising for exploiting the use of iron accumulation as a noninvasive diagnostics tool of pathological processes.