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High-resolution 7T Liver MRI for Pathological Examination

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High-Resolution (7T) Liver MRI for Pathological Examination

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All data generated or analyzed during the study are included in the published paper

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Key Results: N/A

Abbreviations

Magnetic Resonance Imaging = MRI

Two different liver samples from patients who underwent surgical resection were imaged on a 7T MRI using Fat-Suppressed Turbo Spin Echo T2-weighted sequence, reaching spatial resolution of 75x75x200 μ m in 2 hours.

MRI clearly demonstrated the homogeneous architecture of the normal liver (Figure 1) and identified the primary liver lobule, with its centrilobular vein (1b and 1c, arrowhead) and peripheral portal tracts (1b and 1c, arrow) within the interlobular delineations (1b, star). In stage 2 fibrotic liver (Figure S1), MRI of the liver sample demonstrated correlation with pathological findings, easily identifying the same fibrous portal bridges (S1a and S1b, arrows) and enlarged fibrous portal tracts (S1a and S1b, arrowheads), thus enabling a similar grading of fibrosis. With a spatial resolution close to that of the pathology, MRI enabled an easier depiction of the liver lobule boundaries allowing early detection of fibrosis-related architectural distortion. Additionally, the specimen remained intact as no specific preparation was required for MRI and could undergo standard pathologic processing after image acquisition.

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3 **Figure 1. Radiologic-pathologic correlation of normal liver.**

4 (a) Fat-suppressed T2-weighted MRI, with a spatial resolution of 75x75x200 μ m, showing the
5 homogeneous architecture of normal liver. (b) MRI, magnified image, depicting the anatomy of the
6 primary liver lobule with its centrilobular vein (arrowhead) and peripheral portal venous tracts (arrow)
7 within the interlobular delineations (star). (c) Mirrored pathological slide, Masson's Trichrome
8 staining magnification x 4, identifying the liver lobule with the centrilobular vein (arrowhead) and
9 peripheral portal tracts (arrow) within the interlobular delineations (black lines). (d) Schematic
10 representation of the primary liver lobule with the centrilobular vein (central blue dot) and peripheral
11 portal venous tracts (arrow).
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24 **Figure S1. Radiologic-pathologic correlation of liver fibrosis (stage 2).**

25 (a) Fat-suppressed T2-weighted MRI, with a spatial resolution of 75x75x200 μ m, showing the
26 distorted architecture of the liver with the presence of fibrous portal bridges (arrows) and enlarged
27 fibrous portal tracts (arrowheads). (b) Mirrored pathological slide, Masson's Trichrome staining,
28 showing superimposable correlation of the fibrous portal bridges (arrows) and enlarged fibrous portal
29 tracts (arrowheads).
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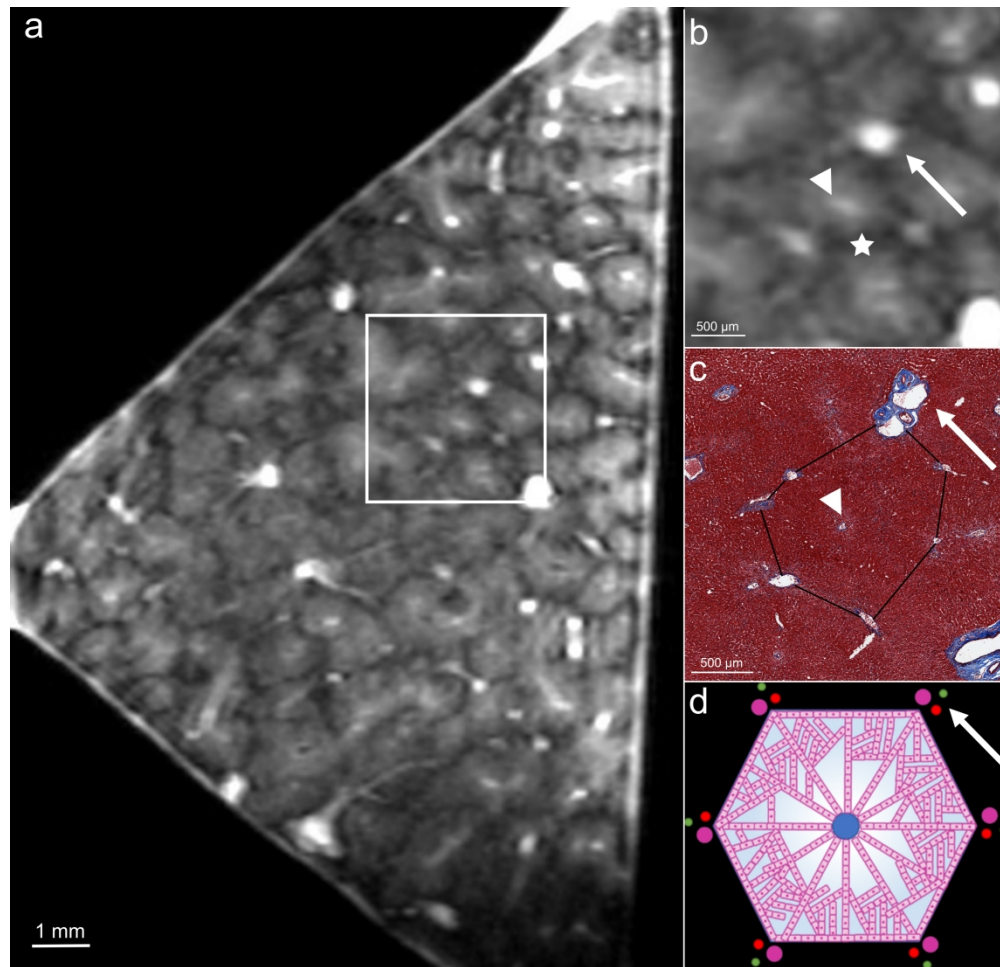


Figure 1. Radiologic-pathologic correlation of normal liver.

(a) Fat-suppressed T2-weighted MRI, with a spatial resolution of $75 \times 75 \times 200 \mu\text{m}$, showing the homogeneous architecture of normal liver. (b) MRI, magnified image, depicting the anatomy of the primary liver lobule with its centrilobular vein (arrowhead) and peripheral portal venous tracts (arrow) within the interlobular delineations (star). (c) Mirrored pathological slide, Masson's Trichrome staining magnification $\times 4$, identifying the liver lobule with the centrilobular vein (arrowhead) and peripheral portal tracts (arrow) within the interlobular delineations (black lines). (d) Schematic representation of the primary liver lobule with the centrilobular vein (central blue dot) and peripheral portal venous tracts (arrow).

443x426mm (236 x 236 DPI)

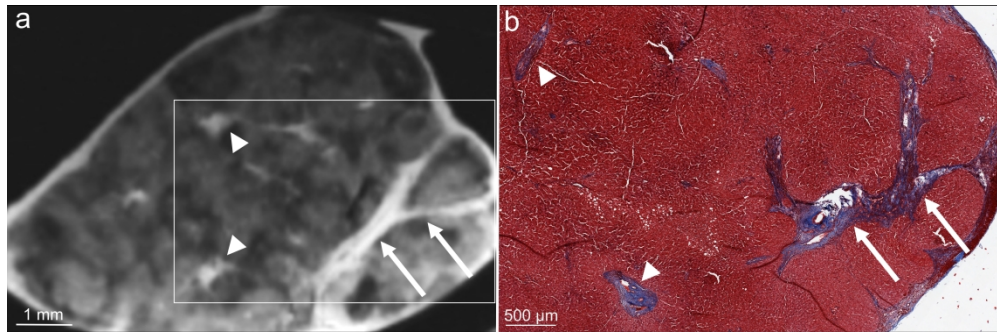


Figure S1. Radiologic-pathologic correlation of liver fibrosis (stage 2).
(a) Fat-suppressed T2-weighted MRI, with a spatial resolution of 75x75x200μm, showing the distorted architecture of the liver with the presence of fibrous portal bridges (arrows) and enlarged fibrous portal tracts (arrowheads). (b) Mirrored pathological slide, Masson's Trichrome staining, showing superimposable correlation of the fibrous portal bridges (arrows) and enlarged fibrous portal tracts (arrowheads).

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