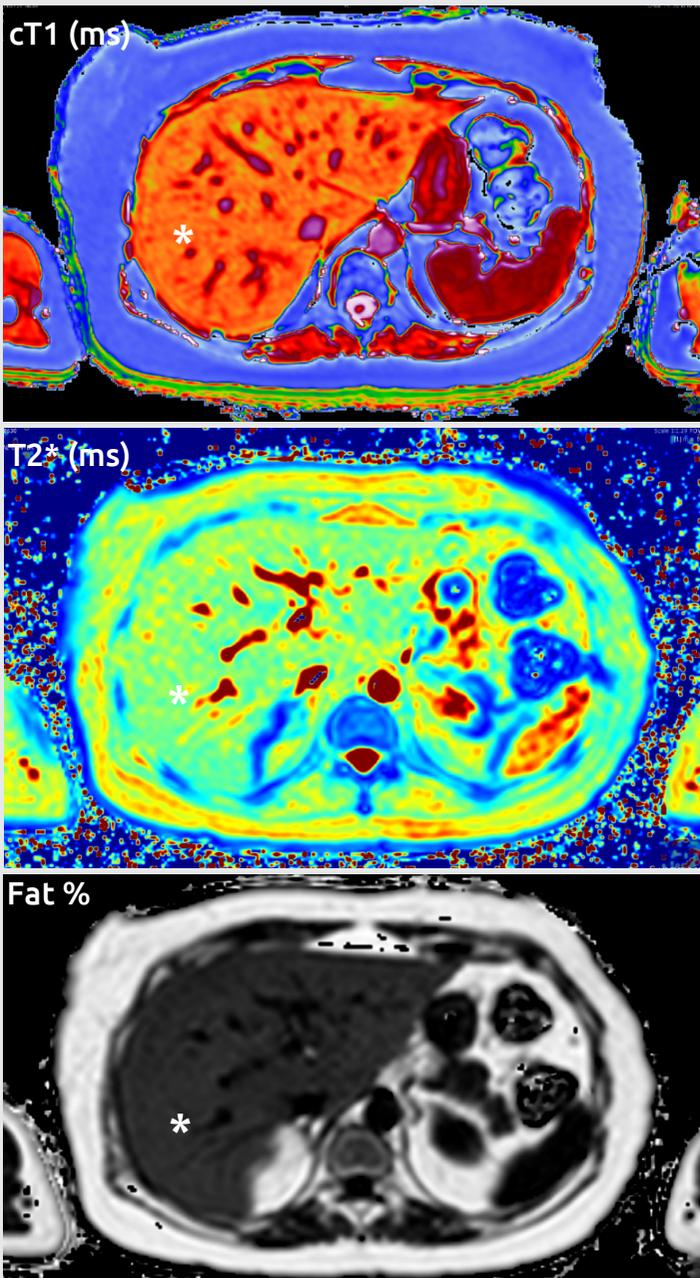


# See what we measure



These images are taken from a patient with suspected NASH. An entire cross-section of the liver can be obtained in a 10-minute scan, giving clear measurements which can aid a physician in diagnosing NASH - this patient has high fat and significant fibro-inflammatory disease, with normal iron, later confirmed on biopsy.

cT1	977.2ms	Normal range 645 – 822	
T2*	25.7 ms	Normal >15.9ms	
Fat	17.2		
			<b>LIF 3.1</b>

Reported values for the selected region of interest in the above images (\*) are shown in the panel above. Images acquired with a 1.5T Siemens scanner.

## Chronic Liver Disease

Liver disease is a growing global problem, particularly lifestyle-driven non-alcoholic fatty liver disease (NAFLD) and its sub-type, non-alcoholic steatohepatitis (NASH). Definitive staging of NAFLD and NASH requires liver biopsy, which is invasive, costly and subject to sampling errors. Cost-effective and accurate non-invasive liver tests are thus urgently required for the **diagnosis, stratification and monitoring** of fatty liver disease.

## The LiverMultiScan Discover Solution

LiverMultiScan Discover is a novel **multiparametric magnetic resonance imaging (MRI)** technique, developed at the University of Oxford. LiverMultiScan Discover characterizes liver tissue by providing accurate and quantitative measures of (i) **hepatic fat**, (ii) **iron** and (iii) **fibro-inflammatory levels**. This is achieved by analysis of MR scan data to produce quantitative maps of T2\* (correlate for iron), proton density fat fraction, and proprietary corrected T1 (cT1; T1 corrected for iron, correlate for fibrosis and inflammation). cT1 is further mapped to a dimensionless scale of 0-4, the **Liver Inflammation and Fibrosis (LIF) score**.

## Key Features

-  Proven correlation with biopsy results<sup>1</sup>
-  Proprietary Liver Inflammation and Fibrosis (LIF) score shown to predict clinical outcomes<sup>2</sup>
-  Analysis of whole liver section to assess regional variations in heterogeneous disease
-  Measuring change in as little as 4 weeks
-  No contrast agent, with up to six patients examined in one hour on a single scanner

## The Service

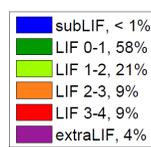
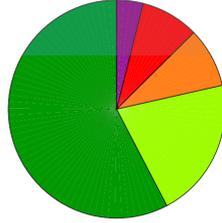
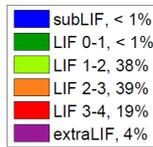
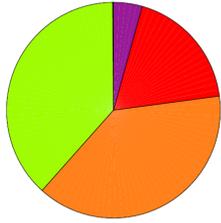
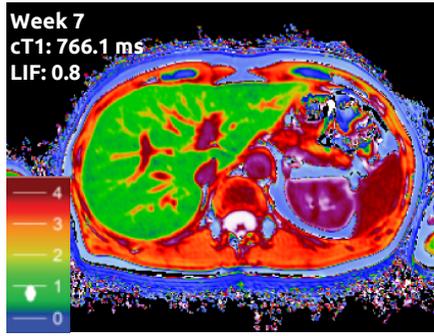
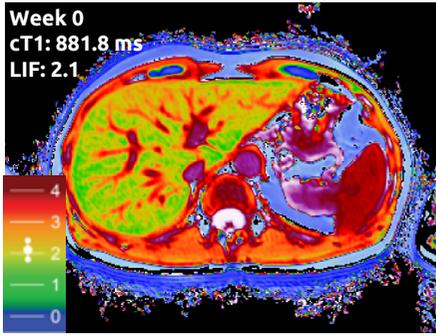
LiverMultiScan Discover is offered as a bespoke Quantitative Analysis Service. Images acquired at sites (using specific MR sequences) are sent securely to Perspectum's CoreLab, where they are analysed by our imaging and clinical specialists and returned as an easily interpreted report with quantitative metrics. Perspectum offers continuous support from site qualification, QC calibration and radiographer training to full support services from our team of MRI physicists, imaging scientists and clinicians.

<sup>1</sup>Banerjee, R. et al., 2014. Multiparametric magnetic resonance for the non-invasive diagnosis of liver disease. J Hepatology. 60(1), 69-77.

<sup>2</sup>Pavlidis, M. & Banerjee, R., 2016. Multiparametric magnetic resonance imaging predicts clinical outcomes in patients with chronic liver disease. J Hepatology. 64(2), 308-315.

# Case Studies

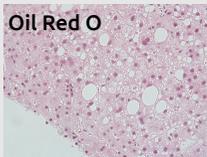
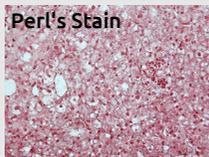
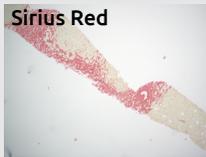
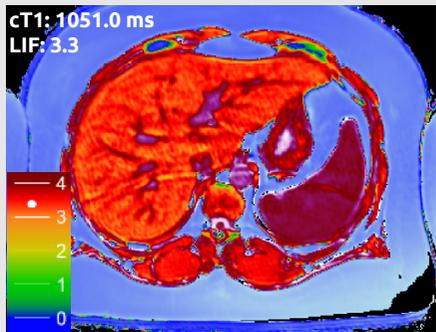
## Hepatitis C



51 year old male with Hepatitis C since 1984. Interferon treatment in 2014 was unsuccessful, but LiverMultiScan Discover scans at Week 0 and Week 7 showed that ledipasvir/sofosbuvir treatment resulted in viral load clearance and a reduction in LIF score.

Enhanced analysis with LiverMultiScan Discover enables segmentation of and assessment across a whole liver slice, offering global statistics and insight into tissue heterogeneity. The pie charts show distribution of LIF scores within each slice, providing an objective and quantified method to monitor disease.

*"The scan is very user friendly and it allows the patient to get a picture of the liver in a way that previous scans didn't allow us to." - 51 M*

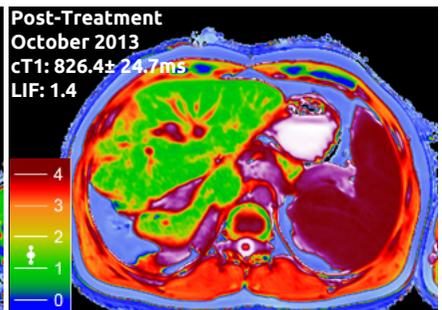
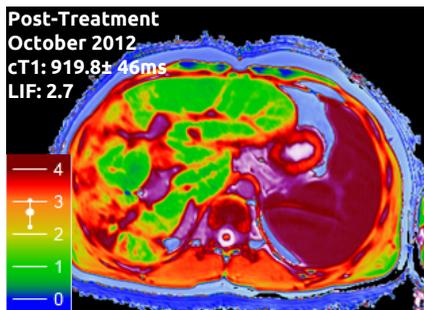
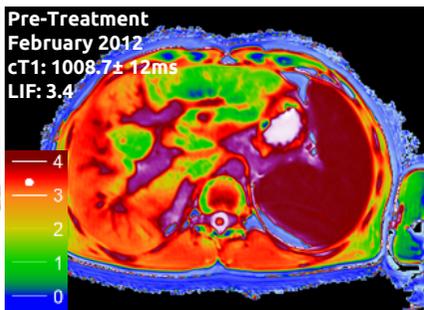


## NAFLD

41 year old female, BMI of 51.7 kg/m<sup>2</sup>. Ultrasound showed enlarged spleen, Fatty liver and pancreas. Patient remained unsure of her true fatty liver disease level, and LiverMultiScan Discover later showed progression to NASH.

*"I feel like there is not enough information on non-alcoholic fatty liver disease. I feel like having this; at least I know where I know where I stand. So yes, this could be life changing in a good way. I'd rather know this than not know this, and I'd rather have this than a biopsy which could be invasive." - 49 F*

## PSC/ AIH Overlap Syndrome



21 year old male with known PSC presented February 2012. Biopsy shows marked fibrosis (Ishak 6/6). LiverMultiScan Discover shows a high cT1 score in the biopsy region, but a cT1 score within the normal range in approximately half of the liver (left). Eight months after steroid and azathioprine treatment (middle), a greater proportion of the liver has a score within the normal range, with further improvements measurable at 20 months post-treatment (right).

*"Having LiverMultiScan several times was helpful, and very reassuring as it was great to see the progression of the liver." - 21 M*