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Development of a highly accurate high-speed imaging technique of lactate concentration in the brain using MRI

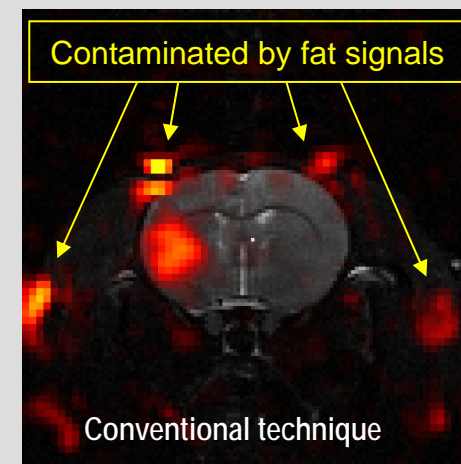
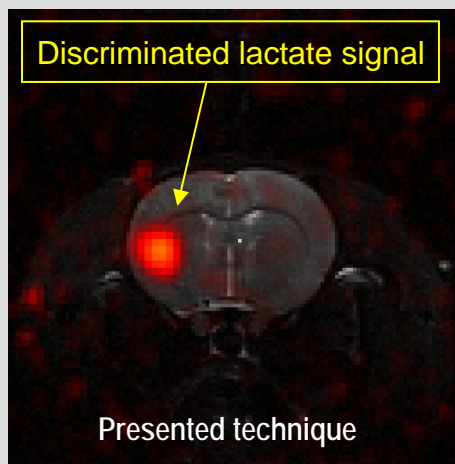
- Discriminating lactate accumulation caused by a stroke, from fat -

Example results obtained with an experimental 7 tesla MRI

Left: Measurement image using the new technique developed
- only lactate imaged.

Right: Measurement image using conventional technique
- both fat and lactate imaged.

Measurement time: 5 minutes
Spatial resolution: 2 mm x 2 mm x 5 mm
No. of pixels: 16 x 16



Hitachi, Ltd., together with Professor TANAKA Chuzo, Head of the Medical Education and Research Center of Meiji University of Integrative Medicine, have developed a highly accurate high-speed “lactate imaging technique” to identify lactate accumulated in areas where cerebral ischemia has occurred using MRI (magnetic resonance imaging system). This technique takes advantage of the slight difference in waveform between lactate and fat signals to distinguish between the two and to identify only the lactate. Further, by applying “echo planar technique” which scans the measurement space in a zig-zag trajectory, it is possible to collect the signals necessary for efficiently creating an image, thus enabling high speed imaging of the lactate.

When this technology was applied to a 7 tesla (unit of magnetic field strength, 1 tesla = 10^4 gauss) experimental MRI, it was possible to image lactate accumulated in tissue within approximately 5 minutes. As lactate is known to accumulate in areas where oxygen depletion has occurred, such as lesions caused by cerebral ischemia; this technology is expected to contribute to a method for the quick identification of affected areas.