Noninvasive Ultra-short Acquisition Delay Magnetic Resonance Spectroscopy Measurement

Fast, high-resolution MRI spectroscopy method for sodium/T2* mapping in muscles.

Researchers at Purdue University have developed a new method for measuring sodium and T2* values in muscles in real-time. In this technique, T2* is measured voxel-wisely at 3T using an accelerated density-weighted concentric ring trajectory (DW-CRT) magnetic resonance spectroscopic imaging (MRSI) device. The algorithms in DW-CRT MRSI account for quantity of nuclei detected with respect to high sampling frequency. Unlike current slice-selective gradient technologies, DW-CRT MRSI uses a non-echo method which prevents time delays and detection limitations. The imaging technique fine-tuned by Purdue researchers can be used to monitor the health of skeletal muscles with improved resolution, reliability, speed, accuracy, and convenience. In addition, DW-CRT MRI can be used to measure the efficacy of therapeutics with ease.

Advantages:

-Reliable

-Fast

-High Resolution Images

Potential Applications:

-Drug Discovery

-MRI

Technology Validation:

Purdue researchers were able to map fast and slow T2* of human calf cells in vivo with minimal sensitivity reduction. The mean of T2* fast was found to

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be 0.7 +/- 0.1 ms and T2* slow was found to be 13.2 +/- 0.2 ms. The model between T2* corrected voxel-wise and reference concentration result in absolute muscle sodium concentrations 26.3 +/- 3.3 mM.

Recent Publication:

"Density-Weighted Concentric Ring Trajectory using simultaneous multi-band acceleration: 3D metabolite-cycled magnetic resonance spectroscopy imaging at 3T"

Cold Spring Harbor Laboratory

bioRxiv Journal

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Intellectual Property:

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