Noninvasive Ultra-short Acquisition Delay Magnetic Resonance Spectroscopy Measurement

Track Code: 2020-EMIR-69079

Categories:
- Biotechnology
- Medical/Health

Keywords:
- Biodynamic imaging
- Biotechnology
- Diagnostic Imaging
- Disease Detection
- Medical Imaging
- Medical/Health
- Molecular Imaging
- MRI

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 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
DOI: 10.1101/628594

People:

- Emir, Uzay E (Project leader)
- Alhulail, Ahmad

Intellectual Property:

Application Date: May 19, 2021
Type: Provisional-Patent
Country of Filing: United States
Patent Number: (None)
Issue Date: (None)

Application Date: May 19, 2020
Type: Provisional-Patent
Country of Filing: United States
Patent Number: (None)
Issue Date: (None)

Contact OTC:

Purdue Office of Technology Commercialization
The Convergence Center
101 Foundry Drive, Suite 2500
West Lafayette, IN 47906

Phone: (765) 588-3475
Fax: (765) 463-3486
Email: otcip@prf.org