Improving Perfusion Magnetic Resonance Imaging Using Ultra-Fast Arterial Spin Labeling

Tech ID: 32409 / UC Case 2020-233-0

BACKGROUND

Noninvasive perfusion (blood flow) imaging through Magnetic Resonance Imaging (MRI) techniques has been widely applied in imaging applications in medical, biological and other fields, using Arterial Spin Labeling (ASL). A typical ASL perfusion MRI technique produces an image of a selected body part under examination by manipulating the magnetic spins in arterial blood and processing measured responses in the target tissue. However, ASL MRI is a challenging procedure to perform in areas where blood flow is slow or obstructed due to vascular diseases, such as in stroke, or in applications where high temporal resolution is desired, such as in functional MRI.

BRIEF DESCRIPTION

Prof. Jia Guo and colleagues from the University of California, Riverside have developed a method for improving perfusion Magnetic Resonance Imaging (MRI) using Velocity Selective Arterial Spin Labeling (VSASL). This method uses VS labeling pulses that are capable to only label the blood that is moving within a narrow band of velocities and keep the blood moving at higher velocities unperturbed. This creates a small bolus of label that can be detected readily and quickly. This method provides MRI imaging that is far superior than conventional ASL MRI techniques with a doubled temporal resolution, improved signal-to-noise ratio (SNR) efficiency and quantification accuracy.

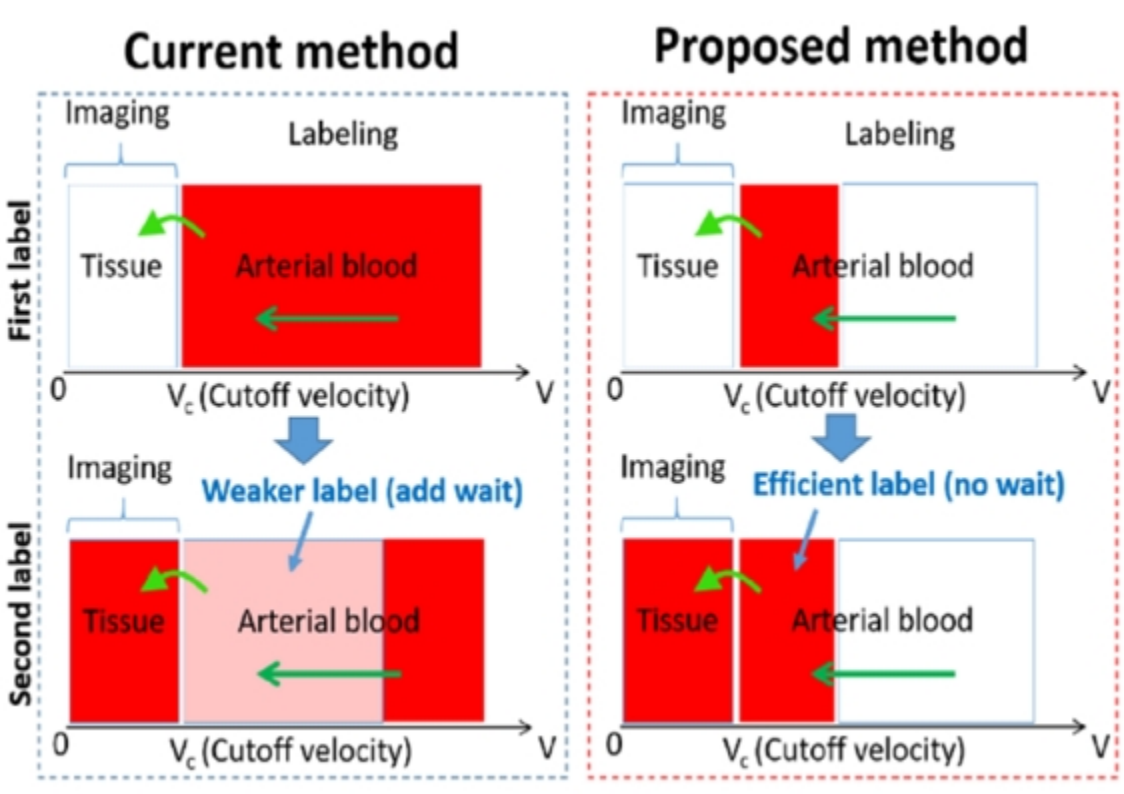

Fig 1: Schematics showing how UCR's narrow-band velocity selectivity enables ultra-fast perfusion imaging

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OTHER INFORMATION

KEYWORDS

MRI, arterial spin labeling, velocity selective arterial spin labeling, velocity selective inversion, magnetic resonance imaging, fMRI

CATEGORIZED AS

- Imaging
  - Medical
- Medical
  - Imaging

RELATED CASES

2020-233-0

APPLICATIONS

- To enable the use of ASL MRI in challenging applications such as stroke
- For use in fMRI applications for achieving superior temporal resolution

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	WO 2022/023126	10/20/2022	2020-233

Additional Patent Pending

RELATED MATERIALS

- Guo, J. Ultra-fast arterial spin labeling with narrow-band velocity-selectivity. Proc. Intl. Soc. Mag. Reson. Med. 29th (2021) p.2679.

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