Permalink

# Novel Arterial Spin Labeling (ASL) Method with 30 Percent Reduction in Scan Time for Measuring Blood Perfusion and Transit Delay

Tech ID: 21401 / UC Case 2010-177-0

# PATENT STATUS

Country	Туре	Number	Dated	Case
United States Of America	Issued Patent	8,965,480	02/24/2015	2010-177

## BACKGROUND

Reduction in scan time for MRI translates to savings in machine usage and to patient's comfort by shortening the time to stay motionless.

#### **TECHNOLOGY DESCRIPTION**

UC San Diego researchers have developed a novel arterial spin labeling (ASL) method, which achieves significant reduction in total scan time (by ~30 percent) and in sensitivity to subject motion, for measuring blood perfusion and transit delay with MRI. Using the invention method, the measured blood flow is less sensitive to transit delay and does not require additional calibration scans, such as T1 or M<sub>0</sub> measurements. The technology utilizes the resulting attributes of pre-saturation pulse that saturates the imaging slice immediately before the labeling pulse. The pre-saturation pulse causes the tissue signal to recover from zero at the beginning of each repetition time (TR) which in turn results in the

following properties:

The tissue signal intensity is independent of TR, thus shorter TR can be used for scans with short post-labeling delays (PLD, the time between the end of labeling pulse and the beginning of data acquisition) and TR can be increased as PLD increases. The tissue signal intensity at each PLD follows a saturation recovery curve determined by the tissue T1; thus T1 and M<sub>0</sub> can be estimated by using the equation below without the need for scans for T1 measurement and scans for estimating M<sub>0</sub>, and coil sensitivities.  $S(t) = M_0(1-e^{-t/T1})$ 

Where t is the acquisition time after the pre-saturation,

which is T+PLD, and T is the labeling duration.

## APPLICATIONS

The technology is applicable to all pulse (such as FAIR and PICORE) and pseudo-continuous ASL (PCASL) for perfusion imaging for vascular,

tumor, infectious, or inflammatory diseases involving wide spread of transit delay.

#### **ADVANTAGES**

Significant reduction in total scan time (by ~30 percent) and sensitivity to subject motion.

# STATE OF DEVELOPMENT

The technology has been tested on several human subjects.

#### **RELATED MATERIALS**

Available upon request.

K. Lu, T. T. Liu, and Y. Jung, Arterial Transit Delay Measurement Using Pseudo-Continuous ASL with Variable TR and Interleaved Post-Labeling Delays, 2010. ISMRM 18th Annual Meeting Abstract #4663 and Corresponding Poster.

#### CONTACT

University of California, San Diego Office of Innovation and Commercialization innovation@ucsd.edu tel: 858.534.5815.



#### **OTHER INFORMATION**

#### KEYWORDS

MRI, fMRI, FAIR, PICORE, ASL,

PCASL, perfusion imaging

#### CATEGORIZED AS

Imaging

Medical

```
Medical
```

Diagnostics

**RELATED CASES** 2010-177-0

# University of California, San Diego

Office of Innovation and Commercialization

9500 Gilman Drive, MC 0910, ,

La Jolla,CA 92093-0910

Tel: 858.534.5815 innovation@ucsd.edu https://innovation.ucsd.edu

Fax: 858.534.7345

© 2011 - 2015, The Regents of the University of

California

Terms of use Privacy Notice