

# Improved Perfusion Imaging Using MRI With Velocity-Selective Arterial Spin Labeling Without Spatial Selectivity

Tech ID: 19977 / UC Case 2001-175-0

## BACKGROUND

Aerial spin labeling (ASL) is a powerful MRI technique for non-invasive perfusion imaging of the brain and other organs using arterial blood water as the endogenous contrast agent. However, the conventional spatially and non-vessel selective ASL methods are problematic in that the life of the tracer is shorter than the time of delivery of the tagged blood to the target tissue. The delivery time arises from variations in the distances and flow velocities along the vascular tree from the tagging location to the tissues of interest. The deliver time to the target tissue in pathological cases can be much longer than in healthy subjects. In the important application of stroke, this can lead to false positive findings of low perfusion when, in fact, perfusion is present via collateral routes of circulation.

## TECHNOLOGY DESCRIPTION

Inventors at UC San Diego have improved the time of tracer delivery in non-vessel selective ALS by using velocity-selective tagging. Nearly all arterial blood can be tagged irrespective of the location, bringing the tag much closer to the target tissues. The benefits of the invention are quantitative, non-invasive, clinical evaluation of brain perfusion with whole brain coverage and insensitivity to delayed perfusion.

## APPLICATIONS

The potential applications include screening, real-time evaluations, and post-event clinical analysis for:

- ▶ Diagnostic imaging for stroke and other cerebrovascular diseases.
- ▶ Evaluation of perfusion deficits in brain disorders, such as Alzheimer's disease and schizophrenia.
- ▶ Functional brain imaging.
- ▶ Myocardial ischemia.
- ▶ Ischemic diseases in other organs such as kidney, lung, and muscle.

The improvement is adaptable to all commercial MRI scanners and does not require the injection of external contrast agents. Additionally, it can be developed either as a stand-alone software product added to an MRI to expand its use in the stroke market or integrated into the MRI by the manufacturers.

## RELATED MATERIALS

- ▶ Wong EC, Cronin M, Wu WC, Inglis B, Frank LR, Liu TT. Velocity-Selective Arterial Spin Labeling. Magn Reson Med. 2006 Jun;55(6):1334-41.
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- ▶ Wu W, Wong E. Intravascular Effect in Velocity-Selective Arterial Spin Labeling. Conf Proc IEEE Eng Med Biol Soc. 2005; 6:5790-3.
- ▶ Wu WC, Wong EC. Feasibility of Velocity Selective Arterial Spin Labeling in Functional MRI. J Cereb Blood Flow Metab. 2007 Apr;27(4):831-8. Epub 2006 Aug 16.

## PATENT INFORMATION

See issued U.S. patent #7,587,233.

## PATENT STATUS

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## OTHER INFORMATION

### KEYWORDS

MRI, aerial spin labeling, ASL, diagnostic imaging, stroke, functional brain imaging, ischemia

### CATEGORIZED AS

- ▶ **Computer**
- ▶ Software

### RELATED CASES

2001-175-0

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	7,587,233	09/08/2009	2001-175

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