



Multi-Echo Spin-, Asymmetric Spin-, And Gradient Echo Echoplanar Imaging (Message-EPI) MRI

Tech ID: 29259 / UC Case 2016-153-0

SUMMARY

UCLA researchers in the Department of Radiological Sciences have developed a new MRI pulse sequence optimized for brain imaging.

BACKGROUND

Magnetic Resonance Imaging (MRI) relies on programed pulse-schemes (or pulse programs) to generate images. These pulse-programs dictate not only the type of information being obtained, but also the quality of the resultant images. Methods such as spin-echo, and gradient echo sequences are utilized to obtain magnetic resonance (MR) data on tissues samples, this information is then used to generate 2D and 3D images. While many advances in both MRI technology and pulse-program design have pushed the utility and resolution of MRI imaging, many yield limited, qualitative, or highly specific information. The development of a complex pulse-program that combines the power of spin-echo and gradient echo schemes could potentially revolutionize MR image and data acquisition.

INNOVATION

UCLA researchers led by Prof. Benjamin Ellingson have developed a new multi component spin-echo and gradient echo pulse program for MR imaging related to brain disease such as stroke or tumor. This pulse program uses quadruple spin-echo and echo-gradient sequences to compute quantitative T2, T2*, or R2' measurements. This allows for direct measurement of several clinically relevant biomarkers for cancer or stroke including: vascular penetration, cerebral blood volume, vessel architecture, and vessel diameter, density and size simultaneously.

ADVANTAGES

- ▶ Only pulse-program of its kind to use quadruple spin-echo and echo-gradient pulses to generate quantitative T2, T2*, or R2' measurements
- ▶ Can easily and readily obtain vascular penetration, cerebral blood volume, vessel architecture, and vessel diameter, density and size data
- ▶ Can measure tissue oxygenation
- ▶ Can be implemented on current MRI systems

STATE OF DEVELOPMENT

Obtained preliminary experimental images of brain tumors

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,378,638	07/05/2022	2016-153

CONTACT

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INVENTORS

- ▶ Ellingson, Benjamin M.

OTHER INFORMATION

KEYWORDS

Magnetic resonance imaging, MRI, MR, nuclear magnetic resonance, NMR, NMR imaging, spin echo, gradient echo, imaging, T2, T2*, R2, cerebral blood volume, fMRI, pulse program

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Health
- ▶ **Imaging**
 - ▶ Medical
 - ▶ Other
 - ▶ Software
- ▶ **Medical**
 - ▶ Diagnostics
 - ▶ Imaging
 - ▶ Other
 - ▶ Research Tools
 - ▶ Screening

RELATED CASES

2016-153-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Integrative Leakage Correction For Contrast Agent Extravasation In Dynamic Susceptibility Contrast \(DSC\) - MRI](#)

- ▶ [pH-Weighted MRI Using Fast Amine Chemical Exchange Saturation Transfer \(CEST\) Imaging](#)
- ▶ [Simultaneous pH- And Oxygen-Weighted MRI Contrast Using Multi-Echo Chemical Exchange Saturation Transfer Imaging \(ME-CEST\)](#)

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