



SYSTEM AND METHOD FOR ANALYZING GENE EXPRESSION USING DIFFUSION WEIGHTED MAGNETIC RESONANCE IMAGING (MRI)

[View U.S. Patent Application Publication No. US-2025-0064337 in PDF format.](#)

WARF: P230361US01

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Overview

A fundamental goal of neuroscience is to understand the structure and function of the brain and the neurobiological correlates that give rise to cognition and behavior. The development of magnetic resonance imaging (MRI) provided, for the first time, a powerful tool to study the in vivo brain and to uncover the neural substrates of neurologic, neurocognitive, and neuropsychiatric illness. Contemporary MRI neuroimaging techniques can only indirectly measure underlying pathology by producing imaging-derived phenotypes (IDPs), which serve as indirect macroscale proxies for the molecular processes driving pathological changes in the brain. However, brain architecture and activity are governed by transcriptomic measures. Thus, MRI, and other modern in vivo imaging modalities, are unable to provide clinicians and researchers with the governing molecular processes that underly the macroscale anatomy and limited physiology that can be imaged at this time.

The Invention

UW-Madison researchers have developed systems and methods for using an MRI system to derive information about gene expression and provide an in vivo analysis of the brain in healthy and disease states that goes beyond the anatomical or basic physiological information traditionally available via MRI. For example, unlike traditional MRI that provides anatomical information or limited neuro-physiological information, such as using the blood-oxygen-level- dependent (BOLD) contrast mechanism levered in functional MRI (fMRI), the systems and methods provided herein can utilize dMRI and new analysis techniques to derive information about gene expression.

Additional Information

For More Information About the Inventors

- [John-Paul Yu](#)

Tech Fields

- [Medical Imaging : MRI](#)

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846