High Resolution, Diagnostic Imaging of Fat Composition and Regional Location

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BACKGROUND

Several study have suggested that fat composition and site of deposition can indicate the risk of many disorders, including cancer, type 2 diabetes, heart disease, and liver disease (NASH). In addition, regional differences in fat composition throughout the body suggest a depot-specific impact of stored fatty acids on adipocyte function and metabolism. Current diagnostic tools include MR spectroscopy, which has high spectral resolution but poor spatial resolution, and MRI IDEAL (iterative decomposition of water and fat with echo asymmetry and least squares estimation) gradient echo imaging, which can measure the amount but not the type of fat.

TECHNOLOGY DESCRIPTION

Commonly employed MRI techniques for separating water and fat exploit differences in the precession frequency of protons in fat and water. UC researchers have simplified and improved analysis and data processing by identifying three most-relevant parameters that can be used to qualitatively and quantitatively image fat. By reducing the complexity of an MRI-generated fat spectrum, one is able to significantly improve the diagnostic utility of a scan with minimal effect on the scan time.

APPLICATIONS

This technology can improve diagnostic utility for patients of diverse diseases that are characterized by specific types and locations of fat deposits. Such diseases include cancer, diabetes, and liver disease.

ADVANTAGES

- Totally automated image reconstruction and data analysis.
- Requires only one breath-hold scan added to a standard MR examination.
- Yields diagnostic information that cannot be derived from other non-invasive means.

STATE OF DEVELOPMENT

In vitro validation is complete. Studies with human subjects are underway: the type and quantity of fat in the abdomen are measured with 5 mm resolution in a 24 second scan.

INTELLECTUAL PROPERTY INFO

Pending patents available under confidentiality; worldwide, non-exclusive IP rights and copyright (software) available.

RELATED MATERIALS

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PATENT STATUS

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OTHER INFORMATION

KEYWORDS

fat, saturated fat, triglyceride, imaging, MRI, molecular resonance imaging, diagnostic, diagnosis, quantification, NASH, fatty liver disease, steaohepatitis, hepatitis, hepatic, adipose, adipocyte, cancer, tumor, carcinoma, diabetes, heart disease, liver disease, liver, steatosis, malignant, pre-clinical

CATEGORIZED AS

- **Imaging**
  - Medical
  - Software
- **Medical**
  - Diagnostics
  - Software
- **Research Tools**
  - Other

RELATED CASES

2011-012-0, 2008-830-1, 2010-814-1

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,759,794	09/12/2017	2011-012

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