



US010036796B2

(12) **United States Patent**
Reeder et al.

(10) **Patent No.:** **US 10,036,796 B2**
(45) **Date of Patent:** **Jul. 31, 2018**

(54) **PHANTOM FOR IRON AND FAT QUANTIFICATION MAGNETIC RESONANCE IMAGING**

(58) **Field of Classification Search**
CPC G01R 33/28; G01R 33/44; G01R 33/48
USPC 324/318
See application file for complete search history.

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(56) **References Cited**

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U.S. PATENT DOCUMENTS

2010/0297019 A1* 11/2010 Lanza A61K 49/0002 424/9.2

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FOREIGN PATENT DOCUMENTS

WO WO 2005007240 A1 * 1/2005 A61K 31/166
* cited by examiner

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 512 days.

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(21) Appl. No.: **14/739,571**

(57) **ABSTRACT**

(22) Filed: **Jun. 15, 2015**

Phantoms for use in magnetic resonance imaging (“MRI”) and, in particular, for use in quantifying fat concentration, iron concentration, or both, are provided. The phantoms are constructed to accurately reflect in vivo magnetic resonance signal behavior in the presence of both fat and iron. The phantoms described here can thus be used for phantom-based validation of MRI techniques for the joint quantification of fat and iron concentration, for phantom-based validation of MRI techniques for quantifying fat concentration in the presence of iron overload, and for phantom-based validation of MRI techniques for quantifying iron concentration given the confounding presence of fat.

(65) **Prior Publication Data**

US 2016/0363645 A1 Dec. 15, 2016

(51) **Int. Cl.**
G01V 3/00 (2006.01)
G01R 33/58 (2006.01)
G01R 33/48 (2006.01)

(52) **U.S. Cl.**
CPC **G01R 33/58** (2013.01); **G01R 33/4828** (2013.01)

20 Claims, 2 Drawing Sheets

