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

(10) **Patent No.: US 9,709,564 B2**
(45) **Date of Patent: Jul. 18, 2017**

(54) **ANTI-LYMPHOCYTE AUTOANTIBODIES AS DIAGNOSTIC BIOMARKERS**

(71) Applicant: **Allegheny-Singer Research Institute**, Pittsburgh, PA (US)

(72) Inventors: **Joseph M. Ahearn**, Wexford, PA (US); **Chau-Ching Liu**, Pittsburgh, PA (US); **Susan M. Manzi**, Wexford, PA (US)

(73) Assignee: **Allegheny-Singer Research Institute**, Pittsburgh, PA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/821,670**

(22) Filed: **Aug. 7, 2015**

(65) **Prior Publication Data**

US 2016/0041164 A1 Feb. 11, 2016

Related U.S. Application Data

(60) Provisional application No. 62/035,073, filed on Aug. 8, 2014.

(51) **Int. Cl.**

G01N 33/564	(2006.01)
G01N 33/536	(2006.01)
G01N 33/50	(2006.01)
G01N 33/68	(2006.01)

(52) **U.S. Cl.**

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(58) **Field of Classification Search**

CPC G01N 33/564; G01N 33/5055; G01N 33/505; G01N 33/5052; G01N 33/5047; G01N 33/536; G01N 33/6854; G01N 2800/7095; G01N 2800/104; G01N 2333/70514; G01N 2333/7051; G01N 2333/70517

See application file for complete search history.

(56) **References Cited**

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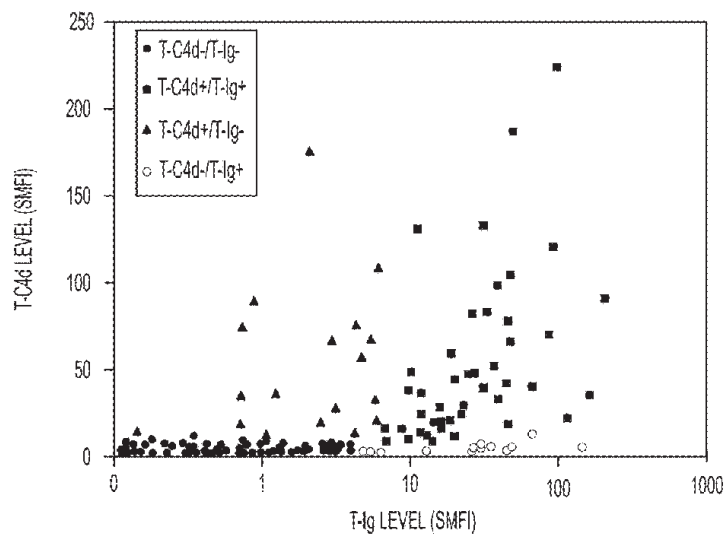
Primary Examiner — Gail R Gabel
(74) *Attorney, Agent, or Firm* — Fox Rothschild LLP

(57) **ABSTRACT**

Provided are methods, systems, and kits for diagnosing or monitoring systemic lupus erythematosus in an individual. In particular aspects, in a blood sample containing white blood cells from the individual, autoantibodies deposited on or contacting with the surface of a T lymphocyte in the sample are quantitated.

22 Claims, 14 Drawing Sheets



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Joseph A. Ahearn, MD
Allegheny Health Network
Inventor of the Year 2024
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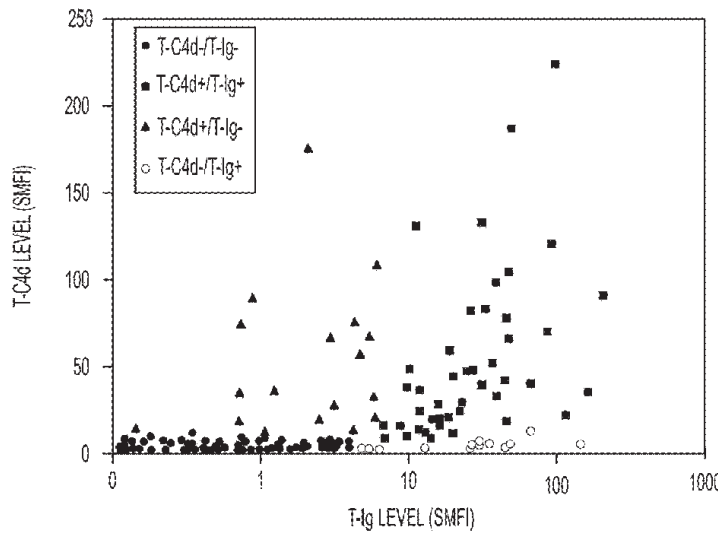

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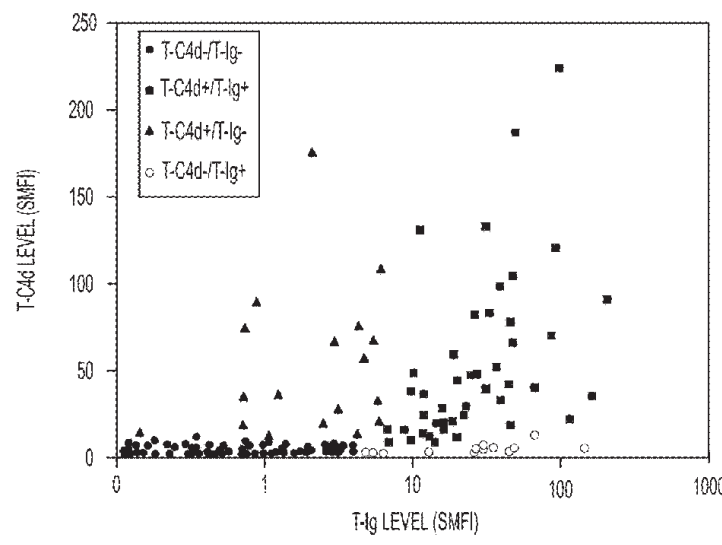

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