US009636336B2

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

(10) **Patent No.: US 9,636,336 B2**
(45) **Date of Patent: *May 2, 2017**

(54) **AMINOESTER DERIVATIVES**

(71) Applicant: **CHIESI FARMACEUTICI S.p.A.**, Parma (IT)

(72) Inventors: **Gabriele Amari**, Parma (IT); **Elisabetta Armani**, Parma (IT); **Wesley Blackaby**, Saffron Walden (GB); **Herve Van De Poeol**, Saffron Walden (GB); **Charles Baker-Glenn**, Saffron Walden (GB); **Naimisha Trivedi**, Saffron Walden (GB)

(73) Assignee: **CHIESI FARMACEUTICI S.p.A.**, Parma (IT)

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

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **15/168,425**

(22) Filed: **May 31, 2016**

(65) **Prior Publication Data**

US 2016/0346268 A1 Dec. 1, 2016

(30) **Foreign Application Priority Data**

Jun. 1, 2015 (EP) 15170041

(51) **Int. Cl.**

A61K 31/4545	(2006.01)
C07D 409/14	(2006.01)
C07D 453/02	(2006.01)
A61K 31/444	(2006.01)
A61K 31/4439	(2006.01)
A61K 31/4436	(2006.01)
A61K 31/496	(2006.01)
C07D 451/02	(2006.01)
A61K 31/46	(2006.01)

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

CPC ***A61K 31/4545*** (2013.01); ***A61K 31/444*** (2013.01); ***A61K 31/4436*** (2013.01); ***A61K 31/4439*** (2013.01); ***A61K 31/46*** (2013.01); ***A61K 31/496*** (2013.01); ***C07D 409/14*** (2013.01); ***C07D 451/02*** (2013.01); ***C07D 453/02*** (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2013/0079313	A1*	3/2013	Armani	C07D 213/89 514/171
2013/0324501	A1*	12/2013	Armani	C07D 401/12 514/158
2014/0155391	A1*	6/2014	Armani	C07D 295/155 514/227.8
2015/0158858	A1*	6/2015	Amari	C07D 409/14 514/210.2
2015/0352091	A1*	12/2015	Armani	C07D 409/14 514/305

FOREIGN PATENT DOCUMENTS

EP	2 022 783	2/2009
WO	2012168226	* 12/2012
WO	2013057013	* 4/2013
WO	2013182451	* 12/2013
WO	2014/086849	6/2014

OTHER PUBLICATIONS

Extended European Search Report issued in Application No. 15170041.6 dated Oct. 22, 2015.
Asthma: U.S. FDS approves new indication for SPIRIVA Respimat, (2016).
X. Soler et al., Curr Allergy Asthma Rep (2014) 14:484.
Clinical Trails.gov, NCT00073177 (2012).
Clinical Trails.gov, NCT00076076 (2012).
Clinical Trails.gov, NCT00163527 (2012).

* cited by examiner

Primary Examiner — Karl J Puttlitz
(74) *Attorney, Agent, or Firm* — Oblon, McClelland, Maier & Neustadt, L.L.P.

(57) **ABSTRACT**

Compounds of formula (I) defined herein are both phosphodiesterase 4 (PDE4) enzyme inhibitors and muscarinic M3 receptor antagonists and are useful for treating diseases of the respiratory tract.

17 Claims, No Drawings