US009408842B2

(12) **United States Patent**
Diaz-Fernández et al.

(10) **Patent No.: US 9,408,842 B2**
(45) **Date of Patent: Aug. 9, 2016**

(54) **SUBSTITUTED PYRANO AND FURANOQUINOLINES, THEIR PREPARATION AND USE AS MEDICAMENTS**

(71) Applicant: **LABORATORIOS DEL DR. ESTEVE S.A.**, Barcelona (ES)

(72) Inventors: **José-Luis Diaz-Fernández**, Manresa (ES); **Ute Christmann**, Castelldefels (ES)

(73) Assignee: **LABORATORIOS DEL DR. ESTEVE S.A.**, Barecelona (ES)

(*) 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.: **14/830,888**

(22) Filed: **Aug. 20, 2015**

(65) **Prior Publication Data**

US 2015/0352098 A1 Dec. 10, 2015

Related U.S. Application Data

(62) Division of application No. 14/374,081, filed as application No. PCT/EP2013/051328 on Jan. 24, 2013, now Pat. No. 9,193,738.

(30) **Foreign Application Priority Data**

Jan. 24, 2012 (EP) 12382020

(51) **Int. Cl.**

C07D 455/04	(2006.01)
C07D 491/00	(2006.01)
A61K 31/4741	(2006.01)
A61K 31/5377	(2006.01)
C07D 491/04	(2006.01)
C07D 491/048	(2006.01)
C07D 491/052	(2006.01)

(52) **U.S. Cl.**
CPC ***A61K 31/4741*** (2013.01); ***A61K 31/5377*** (2013.01); ***C07D 491/04*** (2013.01); ***C07D 491/048*** (2013.01); ***C07D 491/052*** (2013.01)

(58) **Field of Classification Search**
CPC C07D 491/044
USPC 546/89
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

8,394,797	B2 *	3/2013	Corbera Arjona	A61K 31/416 514/234.5
8,492,563	B2 *	7/2013	Corbera-Arjona	C07D 333/54 546/202
9,193,738	B2 *	11/2015	Diaz-Fernandez	C07D 491/04
2007/0203167	A1	8/2007	Schiemann	

FOREIGN PATENT DOCUMENTS

EP	1634873	3/2006
EP	1847542	10/2007
WO	2005/063735	7/2005
WO	2007/098961	9/2007
WO	2009/071657	6/2009

OTHER PUBLICATIONS

Collina et al. Expert Opin. Ther. Patents (2013) 23(5):597-613.*
Bowen, Pharmaceutica Acta Heivetiae, 2000, 74, 211-218.
Cendan. et al., European Journal of Pharmacology, 2005, 511, 73-74.
Cendan, et al., Psychopharmacology, 2005, 182, 485-493.
Chien, et al., European Journal of Pharmacology, 1993, 250, R7-R8.
Chien, et al., European Journal of Pharmacology, 1995: 294, 303-308.
Chien, et al., Journal of Pharmacology and Experimental Therapeutics, 1994, 271, 1583-1590.
Matsumoto, et al., European Journal of Pharmacology, 2003, 469, 1-12.
Maurice, et al., Neuroscience and Biobehavioral Reviews, 2002, 26, 499-527.
Maurice, et al., Pharmacology, Biochemistry and Behavior, 2003, 74, 869-876.
Maurice, et al., Pharmacopsychiatry, 2004, 37 Suppl 3, S198-S207.
Mei, et al., Pharmacology and Experimental Therapeutics, 2002, 300, 1070-1074.
Qulrion, et al., Trends Pharmacol. Sci., 1992, 13, 85-86.
Romieu, et al., Journal of Neuroscience, 2003, 23, 3572-3576.
Romieu, et al., Neuropsychopharmacology, 2002, 26, 444-455.
Alcaide, et al., Chem. Eur. J., 2003, 9, 3415-3426.
Bowen, Pharmaceutica Acta Helvetiae, 2000, 74, 211-218.
DeHaven-Hudkins, et al., Eur. J. Pharmacol., 1992, 227, 371-378.
Extended European Search Report for EP 12382020.1 dated Mar. 30, 2012.
Hanner, et al., Proc. Natl. Acad. Sci., 1996, 93, 8072-8077.
Kaiser, et al., Neurotransmissions, 1991, 7, 1-5.
Kamble, et al., Synlett, 2007, 1379-1382.
Katritzky, et al., Journal of Organic Chemistry, 1997, 62, 8210-8214.
Merskey, et al., IASP, Classification of Chronic Pain, 2nd Edition, IASP Press (2002), 210.
More, et al., Synlett, 2006, 9, 1399-1403.
Quirion, et al., Trends Pharmacol. Sci., 1992, 13, 85-86.
Rai, et al., Synthetic Communications, 2009, 39, 2125-2136.
Ramesh, et al., Synthetic Communications, 2006, 36, 1431-1436.
Ronsisvalle, et al., Pure Appl. Chem., 2001, 73, 1499-1509.
Schläger, et al., Bioorganic & Medicinal Chemistry, 2008, 16, 2992-3001.
Snyder, et al., J. Neuropsychiatry 1989, 1, 7-15.
Walker, et al., Pharmacological Reviews, 1990, 42, 355-402.
Xia, et al., Synlett, 2005, 15, 2357-2361.
Zhang, et al., Nuclear Medicine and Biology, 2002, 29, 469-476.
Zhou, et al., European Journal of Organic Chemistry, 2007, 31, 5265-5269.
Zubkov, et al., Russian Journal of Organic Chemistry, 2007, 43, 1202-1208.

* cited by examiner

Primary Examiner — Nizal Chandrakumar
(74) *Attorney, Agent, or Firm* — Hueschen and Sage

(57) **ABSTRACT**

The present invention relates to new substituted pyrano and furanoquinolines having a great affinity for sigma receptors, especially sigma-1 receptors, as well as to the process for the preparation thereof, to compositions comprising them, and to their use as medicaments.

11 Claims, No Drawings