



- (51) **International Patent Classification:**
C07D 487/04 (2006.01) *C07D 405/12* (2006.01)
- (21) **International Application Number:**
PCT/IN2014/000165
- (22) **International Filing Date:**
14 March 2014 (14.03.2014)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
1111/MUM/2013 25 March 2013 (25.03.2013) IN
- (71) **Applicant:** **GLENMARK PHARMACEUTICALS LIMITED; GLENMARK GENERICS LIMITED** [IN/IN]; Glenmark House, HDO- Corporate Bldg, Wing-A, B. D. Sawant Marg, Chakala, Andheri (East), Mumbai 400099 (IN).
- (72) **Inventors:** **BHATT, Navin G.**; C-414, Mahavir Varsha CHS, Plot No. 8-9-10, Ghansoli, Maharashtra, Navi Mumbai 400701 (IN). **NAIK, Samir**; 104, Shilp-2, The Residency CHS Ltd., LBS Road, Maharashtra, Thane 400604 (IN). **SHARMA, Ajay Kumar**; VPO Guglehar, Tehsial Amb, Himachal Pardesh, Una 177208 (IN). **CHORAGHE, Mahendra**; PL-5, Building No.10, Room No. 07, Sector-17, New Panvel (East), Maharashtra, Navi Mumbai 410206 (IN). **BHIRUD, Shekhar Bhaskar**; House No. 1101, Samarth Angan II, A Wing, Opposite Millat Nagar, Lokhandwala, Andheri West, Maharashtra, Mumbai 400053 (IN).
- (81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,

BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *of inventorship (Rule 4.17(iv))*

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

- (88) **Date of publication of the international search report:**
15 January 2015

(54) **Title:** PROCESS FOR PREPARATION OF TICAGRELOR

(57) **Abstract:** The present invention relates to a process for the preparation of ticagrelor and pharmaceutically acceptable salts thereof.



INTERNATIONAL SEARCH REPORT

International application No.

PCT/IN2014/000165

A. CLASSIFICATION OF SUBJECT MATTER

C07D 487/04(2006.01)i; C07D 405/12(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

C07D 487;; C07D 405

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT,WPI,EPODOC,CNKI,CA,STN,ISI Web of Knowledge:GLENMARK, ticagrelor, triazol+ S pyrimidin+, synthe+, prepar+,structure search, 274693-27-5

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 102731467 A (BRIGHTGENE BIOMEDICAL TECHNOLOGY CO., LTD) 17 October 2012 (2012-10-17) description, example 4 and claims 1-9	1-9
X	CN 1432018 A (ASTRAZENECA AB) 23 July 2003 (2003-07-23) abstract and claim 18	10-12
A	CN 102603751 A (CHINA PHARMACEUTICAL UNIVERSITY) 25 July 2012 (2012-07-25) claims 1-3 and description, paragraphs 76-78	1-12
A	CN 102875537 A (CHANGZHOU PHARMACEUTICAL FACTORY) 16 January 2013 (2013-01-16) the whole document	1-12
A	WO 2012138981 A2 (TEVA PHARMACEUTICAL INDUSTRIES LTD. ET AL.) 11 October 2012 (2012-10-11) the whole document	1-12
A	WO 0034283 A1 (ASTRAZENECA UK LTD. ET AL.) 15 June 2000 (2000-06-15) abstract and claims 1-17	1-12



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

“E” earlier application or patent but published on or after the international filing date

“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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“&” document member of the same patent family

Date of the actual completion of the international search

04 November 2014

Date of mailing of the international search report

25 November 2014

Name and mailing address of the ISA/CN

STATE INTELLECTUAL PROPERTY OFFICE OF THE
P.R.CHINA(ISA/CN)
6,Xitucheng Rd., Jimen Bridge, Haidian District, Beijing
100088 China

Authorized officer

ZHANG,Hengjun

Facsimile No. (86-10)62019451

Telephone No. (86-10)82246670

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/IN2014/000165

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	102731467	A	17 October 2012	WO	2012139455	A1	18 October 2012
CN	1432018	A	23 July 2003	BG	110440	A	31 March 2010
				JP	2003535092	A	25 November 2003
				IS	8825	A	02 June 2009
				NO	20025756	D0	29 November 2002
				EP	1289992	B1	15 March 2006
				DK	1289992	T3	03 July 2006
				WO	0192262	A1	06 December 2001
				MX	PA02011795	A	10 April 2003
				EP	1493745	A1	05 January 2005
				US	2003181469	A1	25 September 2003
				EE	200200665	A	15 June 2004
				EE	05222	B1	15 October 2009
				ZA	200209324	A	16 February 2004
				IL	152777	D0	24 June 2003
				JP	2012149093	A	09 August 2012
				AT	555115	T	15 May 2012
				AU	6287401	A	11 December 2001
				CN	1817883	B	05 October 2011
				IL	202582	A	31 December 2012
				ES	2259031	T3	16 September 2006
				ES	2384708	T3	11 July 2012
				SG	135965	A1	29 October 2007
				SI	1289992	T1	31 August 2006
				HK	1052347	A1	08 September 2006
				NO	323780	B1	02 July 2007
				NO	332306	B1	20 August 2012
				AU	2010257449	A1	20 January 2011
				AU	2001262874	B2	22 March 2007
				AR	068086	A2	04 November 2009
				CN	1247583	C	29 March 2006
				CN	1817883	A	16 August 2006
				EP	2292622	A1	09 March 2011
				GB	0013407	D0	26 July 2000
				RU	2010150799	A	20 June 2012
				US	2007293513	A1	20 December 2007
				CZ	304347	B6	19 March 2014
				AT	320430	T	15 April 2006
				AU	2007200958	B2	07 October 2010
				RU	2005127356	A	10 March 2007
				MY	140674	A	15 January 2010
				US	7265124	B2	04 September 2007
				RU	2325391	C2	27 May 2008
				IL	152777	A	26 November 2008
				PT	1289992	T	31 July 2006
				SK	16852002	A3	05 August 2003
				JP	5036947	B2	26 September 2012
				NO	20071547	A	24 January 2003
				BG	65837	B1	26 February 2010
				BR	0111328	A	10 June 2003

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/IN2014/000165

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	102603751	A	25 July 2012	Non e			
CN	102875537	A	16 January 2013	WO	2014036823	A1	13 March 2014
WO	2012138981	A2	11 October 2012	CA	2832570	A1	11 October 2012
				US	2014094604	A1	03 April 2014
				WO	2012138981	A3	06 March 2014
				EP	2694514	A2	12 February 2014
				US	2014027234	A1	30 January 2014
WO	0034283	A1	15 June 2000	ID	29927	A	25 October 2001
				SK	286007	B6	07 January 2008
				IL	198040	D0	24 December 2009
				US	2006025590	A1	02 February 2006
				RU	2007133926	A	20 March 2009
				US	2013109702	A1	02 May 2013
				SI	1386917	T1	30 September 2011
				TR	200101567	T2	21 December 2001
				CZ	300280	B6	08 April 2009
				PT	1135391	T	30 July 2004
				KR	100822602	B1	16 April 2008
				EP	1135391	B1	17 March 2004
				EP	1386917	B1	22 June 2011
				EP	1386909	A1	04 February 2004
				SK	7492001	A3	07 January 2002
				DK	1386917	T3	29 August 2011
				IL	183969	D0	11 February 2009
				NO	319806	B1	19 September 2005
				JP	2007084551	A	05 April 2007
				SI	1135391	T1	31 August 2004
				US	2010069408	A1	18 March 2010
				JP	5043749	B2	10 October 2012
				CZ	295234	B6	15 June 2005
				AT	261970	T	15 April 2004
				IL	143232	D0	21 April 2002
				EP	1386921	B1	24 December 2008
				DE	69915675	D1	22 April 2004
				US	2008214812	A1	04 September 2008
				DK	1386921	T3	23 March 2009
				NO	20012725	D0	01 June 2001
				JP	2011016831	A	27 January 2011
				RU	2012121883	A	27 November 2013
				HK	1039933	A1	08 October 2004
				AR	058967	A2	05 March 2008
				AR	072756	A2	22 September 2010
				HK	1061246	A1	05 June 2009
				DK	1135391	T3	28 June 2004
				KR	20070007971	A	16 January 2007
				NO	20012725	A	31 July 2001
				BR	9915883	A	21 August 2001
				US	2007265282	A1	15 November 2007
				ES	2318081	T3	01 May 2009
				US	2003144305	A1	31 July 2003

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/IN2014/000165

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
		AU 766618 B2	23 October 2003
		PL 348724 A1	03 June 2002
		EG 24814 A	21 September 2010
		CN 1128801 C	26 November 2003
		CA 2351709 A1	15 June 2000
		IL 143232 A	29 December 2008
		NO 2011007 I2	09 July 2012