

PATENT COOPERATION TREATY

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From the INTERNATIONAL SEARCHING AUTHORITY

PCT ELI LILLY AND COMPANY
PATENT DIVISIONNOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

To:

Wood, Dan L.
Eli Lilly and Company
P.O. Box 6288
Indianapolis, IN 46206-6288
ETATS-UNIS D'AMERIQUEDate of mailing
(day/month/year)

25 January 2019 (25-01-2019)

Applicant's or agent's file reference
X20833**FOR FURTHER ACTION** See paragraphs 1 and 4 belowInternational application No.
PCT/US2018/058104International filing date
(day/month/year)

30 October 2018 (30-10-2018)

Applicant

ELI LILLY AND COMPANY

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the International Search Report.**How?** Directly to the International Bureau of WIPO, 34 chemin des Colombettes
1211 Geneva 20, Switzerland, Facsimile No.: (41-22) 338.82.70For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 - 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
- ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Reminders

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. These comments will be made available to the public after international publication. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established.

Shortly after the expiration of 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90*bis*.1 and 90*bis*.3).

Within 19 months from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later); otherwise, the applicant must, within 20 months from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices. In respect of other designated Offices, the time limit of 30 months (or later) will apply even if no demand is filed within 19 months. For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide*, National Chapters.

Within 22 months from the priority date, the applicant may request that a supplementary international search be carried out by a different International Searching Authority that offers this service (Rule 45*bis*.1). The procedure for requesting supplementary international search is described in the *PCT Applicant's Guide*, International Phase, paragraphs 8.006-8.032.

Name and mailing address of the International Searching Authority

European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040
Fax: (+31-70) 340-3016

Authorized officer

FLANTER, Gerda
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference X20833	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/US2018/058104	International filing date (day/month/year) 30 October 2018 (30-10-2018)	(Earliest) Priority Date (day/month/year) 6 November 2017 (06-11-2017)
Applicant ELI LILLY AND COMPANY		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed
☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6b/a).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box No. II)

3. ☐ **Unity of invention is lacking** (see Box No. III)

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant
☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- ☒ the text is approved as submitted by the applicant
☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No. _____
☐ as suggested by the applicant
☐ as selected by this Authority, because the applicant failed to suggest a figure
☐ as selected by this Authority, because this figure better characterizes the invention
 b. ☐ none of the figures is to be published with the abstract

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2018/058104

A. CLASSIFICATION OF SUBJECT MATTER

INV. C07D401/14 C07D403/14 A61P25/00 A61P37/00 A61P19/02
A61K31/506

ADD.

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 A61P

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)

EPO-Internal, WPI Data, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2012/170976 A2 (MERCK PATENT GMBH [DE]; HODOUS BRIAN L [US]; LIU-BUJALSKI LESLEY [US];) 13 December 2012 (2012-12-13) cited in the application abstract pages 144-145; compound A170 * compounds *; pages 53-227 *biological assays *; pages 227-242 claims 1-24 ----- -/-	1-27



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

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

& document member of the same patent family

Date of the actual completion of the international search

8 January 2019

Date of mailing of the international search report

25/01/2019

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Dunet, Guillaume

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2018/058104

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2014/093230 A2 (MERCK PATENT GMBH [DE]; LIU-BUJALSKI LESLEY [US]; JOHNSON THERESA L [U]) 19 June 2014 (2014-06-19) abstract * fourth compound *; page 61 examples 1-4 * compounds *; pages 42-79 claims 1-17	1-27
A	----- US 2015/152068 A1 (ANGST DANIELA [CH] ET AL) 4 June 2015 (2015-06-04) abstract examples 1-40 paragraphs [0433] - [0439] claims 1-19	1-27
A	----- ZOU YI ET AL: "Structure-based discovery of novel 4,5,6-trisubstituted pyrimidines as potent covalent Bruton's tyrosine kinase inhibitors", BIOORGANIC & MEDICINAL CHEMISTRY LETTERS, PERGAMON, AMSTERDAM, NL, vol. 26, no. 13, 7 May 2016 (2016-05-07), pages 3052-3059, XP029568924, ISSN: 0960-894X, DOI: 10.1016/J.BMCL.2016.05.014 abstract page 3053; figure 1 page 3054; figure 3 * schemes 1, 2 *; page 3055 * scheme 3 *; page 3056; table 1	1-27
A	----- GB 2 516 303 A (REDX PHARMA LTD [GB]) 21 January 2015 (2015-01-21) abstract paragraphs [0009] - [0011] paragraphs [0060] - [0070] examples 1, 2 claims 1-33	1-27
A	----- WO 2017/059280 A1 (UNIV NORTH CAROLINA CHAPEL HILL [US]) 6 April 2017 (2017-04-06) abstract * compounds *; pages 28-30 tables 1-5 examples 1-6 claims 1-30 -----	1-27

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2018/058104

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012170976	A2	13-12-2012	
		AU 2012267491 A1	31-10-2013
		AU 2017235978 A1	19-10-2017
		BR 112013030442 A2	27-09-2016
		CA 2833771 A1	13-12-2012
		CN 103814016 A	21-05-2014
		CN 106831732 A	13-06-2017
		EA 201301353 A1	30-05-2014
		EP 2718270 A2	16-04-2014
		HK 1197234 A1	09-01-2015
		IL 229863 A	29-06-2017
		JP 6298096 B2	20-03-2018
		JP 2014517016 A	17-07-2014
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		JP 2018115165 A	26-07-2018
		KR 20140007954 A	20-01-2014
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		SG 194219 A1	29-11-2013
		SG 10201604682V A	28-07-2016
		SG 10201801668W A	28-03-2018
		US 2014162983 A1	12-06-2014
		US 2015259363 A1	17-09-2015
		US 2017136048 A1	18-05-2017
		US 2018243324 A1	30-08-2018
		WO 2012170976 A2	13-12-2012
		ZA 201307632 B	28-06-2017
WO 2014093230	A2	19-06-2014	NONE
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		AR 098549 A1	01-06-2016
		AU 2014356069 A1	05-05-2016
		CA 2926908 A1	04-06-2015
		CN 105683181 A	15-06-2016
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		EP 3074386 A1	05-10-2016
		EP 3299368 A1	28-03-2018
		ES 2655527 T3	20-02-2018
		HK 1223368 A1	28-07-2017
		HR P20171999 T1	09-02-2018
		HU E037588 T2	28-09-2018
		JP 6342495 B2	13-06-2018
		JP 2016538313 A	08-12-2016
		JP 2018141005 A	13-09-2018
		KR 20160088877 A	26-07-2016
		LT 3074386 T	27-12-2017
		MA 39055 A1	28-02-2018
		PE 08692016 A1	08-09-2016
		PH 12016500791 A1	13-06-2016
		PL 3074386 T3	30-03-2018
		PT 3074386 T	15-11-2017
		SI 3074386 T1	28-02-2018
		SV 2016005206 A	21-11-2016

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2018/058104

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		TN 2016000128 A1	06-10-2017
		TW 201609666 A	16-03-2016
		UA 117256 C2	10-07-2018
		US 2015152068 A1	04-06-2015
		US 2016235746 A1	18-08-2016
		US 2018251432 A1	06-09-2018
		UY 35858 A	30-06-2015
		WO 2015079417 A1	04-06-2015
		ZA 201602275 B	30-08-2017

GB 2516303	A	21-01-2015	NONE

WO 2017059280	A1	06-04-2017	US 2018297977 A1
			18-10-2018
			WO 2017059280 A1
			06-04-2017

TITLE: BTK INHIBITOR COMPOUNDS

APPLICANT: ELI LILLY AND COMPANY

IPC CLASSIFICATION: C07D401/14, C07D403/14, A61P25/00, A61P37/00, A61P19/02, A61K31/506

EXAMINER: Dunet, Guillaume

CONSULTED DATABASES: NPL, DOSYS, EPODOC, WPI, REAXYS, CAPLUS

CLASSIFICATION SYMBOLS DEFINING EXTENT OF THE SEARCH:

IPC:

CPC: C07D401/14, C07D403/14, A61P25/00, A61P37/00, A61P19/02

FI/F-TERMS:

KEYWORDS OR OTHER ELEMENTS FEATURING THE INVENTION:

The present application is directed towards compounds of formula I as BTK inhibitors and their use in therapy.