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— 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:
2 April 2015

Published:

— with international search report (Art. 21(3))

Box No. 1 Nucleotide and/or amino acid sequence(s) (Continuation of item 1.c of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of a sequence listing filed or furnished:

a. (means)

on paper

in electronic form

b. (time)

in the international application as filed

together with the international application in electronic form

subsequently to this Authority for the purposes of search

2. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.: 33-80 and 85-108
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

-----See Supplemental Box-----

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims: it is covered by claims Nos.:
1-3, 30, 31, 81

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - A01N 43/02; A01N 43/54; A01N 43/40; C07D 401/00 (2014.01) CPC - C07D 401/12, C07D 285/08, C07D 401/04 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) CPC: C07D 401/12, C07D 285/08, C07D 401/04 IPC: A01N 43/54, A01N 43/02, A01N43/40, C07D 401/00 (2014.01)		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC: 514/275, 514/361, 514/343, 544/331 (text search, terms below)		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PATBASE: Full-text = AU BE BR CA CH CN DE DK EP ES FI FR GB IN JP KR SE TH TW US WO Google: Scholar/Patents: Bromodomain inhibitor, imidazol[1,2-a]pyridine dimethylisoxazole imidazopyridine phenylamine 2-phenyl isoxazole		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2007/0179178 A1 (Buettelmann et al.) 02 August 2007 (02.08.2007) para [0013]; [0026];[0043]	1-3, 30, 31, 81
Y	US 2002/0032200 A1 (CAI et al.) 14 March 2002 (14.03.2002) para [0009];[0012]; [0019], [0039], [0021], [0022] ;[0039];[0041];[0044];[0045]	1-3, 30, 31, 81
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/>		
* 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 14 January 2015 (14.01.2015)		Date of mailing of the international search report 30 JAN 2015
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I+: claims 1-32, 81, drawn to a compound of Formula (I). The first invention is restricted to the first named compound UMB11 (claim 81). Group I+ will be searched to the extent that it reads on UMB11, without fee. It is believed that claims 1-3, 30, 31, 81 read on this first named invention. Applicants must indicate, if applicable, the claims which read on the first named invention if different than what was indicated above for this group. Failure to clearly identify how any paid additional invention fees are to be applied to the "+" group(s) will result in only the first claimed invention to be searched/examined. An exemplary election would be: UMB22 (claims 1-2, 81).

Group II: claims 82-84, drawn to a compound of Formula (II), (III) or (IV).

The inventions listed as Groups I+ and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Special Technical Features

Group I+ includes the special technical feature of a compound of formula (I), not required by Group II.

Group II includes the special technical feature of a compound of formula (II), (III) and (IV), not required by Group I+.

Another special technical feature of the inventions listed as Group I+ is the specific compounds recited therein. Each compound is considered a distinct technical feature, because there is no significant structural similarities can readily be ascertained among these compounds.

Common Technical Features

The inventions of Groups I+ share the technical feature of a compound having the core structure of Formula (I). However, these shared technical features do not represent a contribution over prior art as being obvious over US 2007/0179178 A1 to Buettelmann et al. (hereinafter "Buettelmann") in view of US 2002/0032200 A1 to Cai et al. (hereinafter "Cai").

Buettelmann discloses (claim 1) a compound similar to that of formula I that displays high affinity and selectivity for GABA A receptor binding sites and might be useful as a cognitive enhancer (para [0013]), wherein XA, YA and XC are each CRD wherein RD is H; Ring A has the formula of isoxazolyl and RA is selected from alkyl and aryl wherein a is 2; L is a bond, d is 0 (para [0026], [0043], 2-(5-methyl-3-phenyl-isoxazol-4-yl)-imidazo[1,2-a]pyridine). Buettelmann does not disclose the NRBR. Cai discloses a compound similar to that of formula I that displays affinity for the benzodiazepine site of GABA A receptor and might be useful for treating CNS disorders (para [0009], [0012]) wherein the has a 2-phenylimidazo[1,2-a]pyridine (para [0019], [0039], [0021], [0022] W is phenyl; A, B, C, D are independently selected from hydrogen). Furthermore, Cai teaches that said GABA A receptor ligand comprises claim NRBR wherein RB is alkyl and RC is heteroaryl (para [0045], X is N(C1-C6 alkyl), G is, i.e., imidazolyl). It would have been obvious to one of ordinary skill in the art to combine the structure activity relationship data disclosed by Buettelmann and Cai, because both disclose an imidazo-[1,2-a]pyridine-ring A series of compounds displaying high affinity and selectivity to GABA A receptor, and thus would have to adapt the NRBR substituent of Cai to the compound of Buettelmann, with improved affinity to GABA A receptor.

The inventions of Groups I+ and II share the technical feature of a compound comprising structure of 2,5-dimethyl isoxazol-1-yl phenyl which is taught by PubChem CID 5325760 (Published on 25 January 2006) (retrieved from <http://pubchem.ncbi.nlm.nih.gov/compound/5325760?from=summary#section=Top> on 20 October 2014). As said technical feature was known in the art at the time of the invention, this cannot be considered special technical feature that would otherwise unify the groups.

Groups I+ and II therefore lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.