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(54) Title: PROCESS FOR THE PREPARATION OF INTERMEDIATES USEFUL IN THE PREPARATION OF COMPOUNDS THAT MODULATE SPLICING

(57) Abstract: Described herein are processes for preparing compounds useful in the preparation of small molecule splicing modulator compounds that modulate splicing of mRNA, such as pre-mRNA, encoded by genes, and compounds used in such processes.



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 21/44794

A. CLASSIFICATION OF SUBJECT MATTER

IPC - A61K 31/439; A61P 25/00; C07D 471/08 (2021.01)

CPC - A61K 31/501; A61K 31/5383; A61K 45/06

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)

See Search History document

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

See Search History document

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

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y -- A	WO 2019/028440 A1 (SKYHAWK THERAPEUTICS INC) 7 February 2019 (07.02.2019), especially: para [0556] scheme; para [0750].	1-3,15-16 ----- 4 ---- 5-6
X	US 2016/0280721 A1 (THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ILLINOIS) 29 September 2016 (29.09.2016), especially: para [0288] formula (+/-)-7a).	17
X	- PubChem-SID-151978989, Modify Date: 2 June 2019 (02.06.2019), pg 2, figure, this is a purchasable chemical.	18,20
X	- ONO et al. "Regioselective Preparation of Allylic Sulfones by Palladium-Catalyzed Reactions of Allylic Nitro Compounds with Sodium Benzenesulfinate", Bull. Chem. Soc. Jpn. 1986. 59, pp 405-410, especially: pg 406, col 1, Scheme (4), PhSO ₂ Na.	19
Y -- A	WO 2019/191229 A1 (PTC THERAPEUTICS INC) 3 October 2019 (03.10.2019), especially: abstract; pg 155, ln 10-15, Example 1, scheme; pg 156, ln 15-26, step 3, 4-[3-(methoxymethoxy)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl]-l-tetrahydropyran-2-yl-pyrazole.	4 ---- 5-6

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"D" document cited by the applicant in the international application	"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
"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"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	

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 21/44794

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.: 13-14
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 extra sheet)

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.:
1-6,15-20

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.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 21/44794

--BOX III - LACK OF UNITY--

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 searched, the appropriate additional search fees must be paid.

Group I: Claims 1-6 and 15-20, directed to a process for preparing a compound of Formula (I), or a pharmaceutically acceptable salt pharmaceutically acceptable solvate thereof.

Group II: Claims 7-12 and 21-25, directed to a process for preparing a compound of Formula (VII).

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 requires a process for preparing a compound of Formula (I), which is not required by Group II.

Group II requires a process for preparing a compound of Formula (VII), which is not required by Group I.

Shared Common Features

There is no significant shared feature between the groups.

As the technical features were known in the art at the time of the invention, this cannot be considered a 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.

*Item 4 (contd): Claims 13-14 are unsearchable because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).