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(71) Applicants: **MEMORIAL SLOAN-KETTERING CANCER CENTER** [US/US]; 1275 York Avenue, New York, NY 10065 (US). **RESEARCH FOUNDATION OF THE CITY UNIVERSITY OF NEW YORK** [US/US]; 230 West 41st Street, New York, NY 10036 (US). **THE JOHNS HOPKINS UNIVERSITY** [US/US]; 3400 North Charles Street, Baltimore, MD 21218 (US).

(72) Inventors; and

(71) Applicants: **TAN, Derek, Shieh** [US/US]; 345 East 73rd St., Apt. 7C, New York, NY 10021 (US). **STANDKE, Lisa, Charlotte** [US/US]; 442 East 77th Street, Apartment 4A, New York, NY 10075 (US). **QUADRI, Luis Edmundo, Nereo** [US/US]; 36 Melby Lane, Roslyn, NY 11576 (US). **BYTHROW, Glennon, Valere** [US/US]; 5745 N Ridge Ave., 3E, Chicago, IL 60660 (US). **BISHAI, William, Ramses** [—/US]; 17 S. Chester Street, Baltimore, MD 21231 (US). **LUN, Shichun** [—/US]; 3113 Brookmede Road, Ellicott City, MD 21042 (US).

(74) Agent: **ROSES, Jonathan, B.** et al.; Wolf, Greenfield & Sacks, P.C., 600 Atlantic Avenue, Boston, MA 02210-2206 (US).

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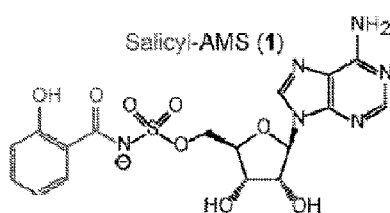


Figure 1A

(57) Abstract: Provided herein are compounds of Formula (I), and pharmaceutically acceptable salts or tautomers thereof. Also provided are pharmaceutical compositions, kits, and methods involving the inventive compounds for the treatment and/or prevention of an infectious disease (e.g., bacterial infection (e.g., *Mycobacterium* infection (e.g., tuberculosis)). (I)



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2019/068107

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A61K 31/7064; A61K 31/505; A61K 31/519; C07D 239/00; C07D 247/02; C07D 487/04 (2020.01)

CPC - A61K 31/7064; A61K 31/505; A61K 31/519; C07D 239/00; C07D 247/02; C07D 487/04 (2020.05)

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

USPC - 514/43; 514/49; 514/127 (keyword delimited)

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.
A	✓ ESCHGFÄLLER et al., Synthesis and Biodistribution of a Short Nonionic Oligonucleotide Analogue in Mouse with a Potential to Mimic Peptides, Journal of Medicinal Chemistry, Vol. 41, No. 3, 08 January 1998, Pgs. 276-283	1, 2
A	US 2006/0189636 A1 (CRITCHLEY et al) 24 August 2006 (24.08.2006) entire document	1, 2
A	US 2018/0243328 A1 (JANSSEN PHARMACEUTICA NV) 30 August 2018 (30.08.2018) entire document	1, 2

 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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

13 May 2020

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P.O. Box 1450, Alexandria, VA 22313-1450

Facsimile No. 571-273-8300

Authorized officer

Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300  
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2019/068107

**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.: 46-60  
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:

Claims 46-60 are held unsearchable as a meaningful opinion cannot be formed without the sequence listing; the applicant did not, within the prescribed time limit pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rule 13ter.1(a) or (b).

3.  Claims Nos.: 4-15, 18-20, 22-45  
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(s).

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, 2

- 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.

Continued from Box No. III Observations where unity of invention is lacking

Claims 1 and 2 have been analyzed subject to the restriction that the claims read on a compound of Formula (I) or a pharmaceutically acceptable salt or tautomer thereof, wherein: V1 is =CR3-; V2 is =CH-; R1 is unsubstituted alkyl, wherein the unsubstituted alkyl is methyl; each of R2 and R3 is hydrogen; W1 is -O-; each of R9, R10, R11 and R12 is hydrogen; each of Ra and Rb is independently hydrogen; X1 is a bond; X2 is a bond; R6 is first formula shown, Y is unsubstituted alkyl, wherein the unsubstituted alkyl is C1 alkyl; each of R6a and R6b is independently hydrogen; and the dotted bond represents a single bond.

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 need to be paid.

Group I+: claims 1-3, 16, 17, and 21 are drawn to compounds of Formula (I) or a pharmaceutically acceptable salt or tautomer thereof.

The first invention of Group I+ is restricted to a compound of Formula (I) or a pharmaceutically acceptable salt or tautomer thereof, wherein: V1 is =CR3-; V2 is =CH-; R1 is unsubstituted alkyl, wherein the unsubstituted alkyl is methyl; each of R2 and R3 is hydrogen; W1 is -O-; each of R9, R10, R11 and R12 is hydrogen; each of Ra and Rb is independently hydrogen; X1 is a bond; X2 is a bond; R6 is first formula shown, Y is unsubstituted alkyl, wherein the unsubstituted alkyl is C1 alkyl; each of R6a and R6b is independently hydrogen; and the dotted bond represents a single bond. It is believed that claims 1 and 2 read on this first named invention and thus these claims will be searched without fee to the extent that they read on the above embodiment.

Applicant is invited to elect additional formula(e) for each additional compound to be searched in a specific combination by paying an additional fee for each set of election. Each additional elected formula(e) requires the selection of a single definition for each compound variable. An exemplary election would be a compound of Formula (I) or a pharmaceutically acceptable salt or tautomer thereof, wherein: V1 is =N-; V2 is =CH-; R1 is unsubstituted alkyl, wherein the unsubstituted alkyl is methyl; R2 is hydrogen; W1 is -O-; each of R9, R10, R11 and R12 is hydrogen; each of Ra and Rb is independently hydrogen; X1 is a bond; X2 is a bond; R6 is first formula shown, Y is unsubstituted alkyl, wherein the unsubstituted alkyl is C1 alkyl; each of R6a and R6b is independently hydrogen; and the dotted bond represents a single bond. Additional formula(e) will be searched upon the payment of additional fees. Applicants must specify the claims that read on any additional elected inventions. Applicants must further 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.

The inventions listed in Groups I+ 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:

The Groups I+ formulae do not share a significant structural element requiring the selection of alternatives for the compound variables R1, R2, R6, R9, R10, R11, R12, Ra, Rb, V1, V2, X1, W1, dotted bond and accordingly these groups lack unity a priori.

Additionally, even if Groups I+ were considered to share the technical features of a compound of Formula (I); or a pharmaceutically acceptable salt or tautomer thereof, these shared technical features do not represent a contribution over the prior art as disclosed by "Synthesis and Biodistribution of a Short Nonionic Oligonucleotide Analogue in Mouse with a Potential to Mimic Peptides" to Eschgfäller et al.

"Synthesis and Biodistribution of a Short Nonionic Oligonucleotide Analogue in Mouse with a Potential to Mimic Peptides" to Eschgfäller et al. teach a compound of Formula (I); wherein V1 is =CR3-; V2 is =N-; R1 is substituted alkyl; R2 is -N(Re)2 and R3 is hydrogen; W1 is -O-; R9 is -OR4, R10 is hydrogen, R11 is hydrogen, and R12 is substituted alkyl; R4 is an oxygen protecting group; each of Ra and Rb is independently hydrogen; X1 is -(C(Rd)2)q-; X2 is a bond; each occurrence of Rd is independently hydrogen; R6 is the first shown structure; Y is substituted alkyl; each of R6a and R6b is independently hydrogen; each occurrence of Re is hydrogen or acyl; each q is 1; and the dotted bond is a single bond (Pg. 277, Scheme 1, See compound 7a).

The inventions listed in Groups I+ therefore lack unity under Rule 13 because they do not share a same or corresponding special technical feature.