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(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, BR, BW, BY, BZ, CA, CH, 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, IS, JP, KE, KG, KM, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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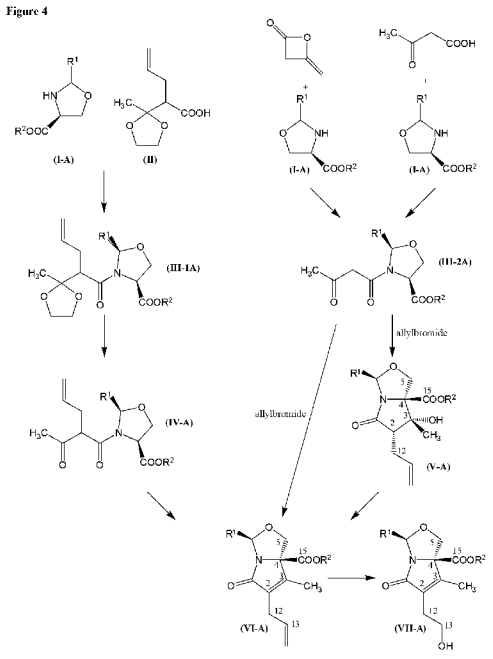
— *with international search report (Art. 21(3))*

— *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))*

[Continued on next page]

(54) **Title**: TOTAL SYNTHESIS OF SALINOSPORAMIDE A AND ANALOGS THEREOF

Figure 4



(57) **Abstract**: The present application relates to certain compounds and to methods for the preparation of certain compounds that can be used in the fields of chemistry and medicine. Specifically, described herein are methods for the preparation of various compounds and intermediates, and the compounds and intermediates themselves. More specifically, described herein are methods for synthesizing Salinosporamide A and its analogs that includes forming a compound of formula (VIII).

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18 November 2010

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. C07D487/04 C07D487/14

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

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 practical, search terms used)
EPO-Internal, WPI Data, BEILSTEIN 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.
E	US 2009/234137 A1 (LING TAOTAO [US] ET AL.) 17 September 2009 (2009-09-17) The whole document.	1-94, 96-101, 120-137, 140-149
A	WO 2007/117591 A2 (NEREUS PHARMACEUTICALS INC [US]; LING TAOTAO [US]; MACHERLA VENKATA RA) 18 October 2007 (2007-10-18) Page 11, scheme A; page 104, scheme 8-3; pages 134-136, examples 7, 8.	1-94, 96-101, 120-137, 140-149
A	LING ET AL.: "Enantioselective Total Synthesis of (-)-Salinosporamide A (NPI-0052)" ORGANIC LETTERS, vol. 9, no. 12, 2007, pages 2289-2292, XP002553295	1-94, 96-101, 120-137, 140-149

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[X] Further documents are listed in the continuation of Box C.

[X] 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 document 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	Date of mailing of the international search report
2 November 2009	28/09/2010

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Weisbrod, Thomas

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/036376

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	-& LING ET AL.: "Supporting information: Enantioselective Total Synthesis of (-)-Salinosporamide A (NPI-0052)" ORGANIC LETTERS SUPPORTING INFORMATION, [Online] 2007, pages S1-S34, XP002555482 Retrieved from the Internet: URL:http://pubs.acs.org/doi/suppl/10.1021/ol0706051/suppl_file/ol0706051si20070501_103247.pdf> [retrieved on 2009-11-02] compounds 5, 10, 23, 24, 25	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/036376

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.:
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 additional 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 an 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.:

see additional sheet

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-94, 96-101, 120-137, 140-145 (all complete), 146-149 (part)

directed to methods of synthesis involving the compounds (XXII), (XXIV) and/or (XXV) (independent claims 1, 80, 89), the compounds (VII), (VIII) and/or (IX) (independent claims 8, 83, 92, 96, 99) and the compounds (XXIV), (VII) and (VIII) (independent claims 140, 142, 144);

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2. claims: 95, 138, 139 (all complete), 146-149 (part)

directed to a method of preparing compound (VI-A) and the compounds (Va-A) and (VI-A) occurring therein;

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3. claims: 102-119 (complete)

directed to processes for preparing compound (VI).

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2009/036376

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009234137 A1	17-09-2009	WO 2009134531 A2	05-11-2009
WO 2007117591 A2	18-10-2007	AU 2007235323 A1	18-10-2007
		CA 2648317 A1	18-10-2007
		EP 2013167 A2	14-01-2009
		JP 2009532484 T	10-09-2009
		KR 20080109071 A	16-12-2008