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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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

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(54) Title: NON-CLASSI ENGINEERED CRISPR-CAS POLYNUCLEOTIDE TARGETING SYSTEM

(57) Abstract: Described herein are non-Class I engineered CRISPR-Cas systems and components thereof, formulations thereof, cells thereof, and organisms thereof. Methods of making and using the CRISPR-Cas system described herein.



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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
 INV. C12N9/22 C12N15/10 C12N15/82
 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)
 C12N C40B

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, BIOSIS, EMBASE, Sequence Search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	MAZHAR ADLI: "The CRISPR tool kit for genome editing and beyond", NATURE COMMUNICATIONS, vol. 9, no. 1, 15 May 2018 (2018-05-15), XP055690910, DOI: 10.1038/s41467-018-04252-2 figures 3,4	1-20, 24-38
Y	VLADIMIR V. KAPITONOV ET AL: "ABSTRACT", JOURNAL OF BACTERIOLOGY, vol. 198, no. 5, 1 March 2016 (2016-03-01), pages 797-807, XP055393473, ISSN: 0021-9193, DOI: 10.1128/JB.00783-15 abstract	1-20, 24-38
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 15 September 2020	Date of mailing of the international search report 19/11/2020
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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 Griesinger, Irina
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2020/033863

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.:

1-20, 24-38(all partially)

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
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 3 009 511 A2 (BROAD INST INC [US]; MASSACHUSETTS INST TECHNOLOGY [US] ET AL.) 20 April 2016 (2016-04-20) paragraph [0325]; claim 1 -----	1-20, 24-38
Y	WO 2017/184786 A1 (BROAD INST INC [US]; MASSACHUSETTS INST TECHNOLOGY [US] ET AL.) 26 October 2017 (2017-10-26) claims 17,22,23 -----	1-20, 24-38
Y	BAYAT HADI ET AL: "The Conspicuity of CRISPR-Cpf1 System as a Significant Breakthrough in Genome Editing", CURRENT MICROBIOLOGY, SPRINGER-VERLAG, NEW YORK, vol. 75, no. 1, 30 November 2017 (2017-11-30), pages 107-115, XP036390744, ISSN: 0343-8651, DOI: 10.1007/S00284-017-1406-8 [retrieved on 2017-11-30] Conclusions -----	1-20, 24-38
Y	WU WEN Y ET AL: "Genome editing by natural and engineered CRISPR-associated nucleases", NATURE CHEMICAL BIOLOGY, NATURE PUB. GROUP, NEW YORK, vol. 14, no. 7, 18 June 2018 (2018-06-18), pages 642-651, XP036525012, ISSN: 1552-4450, DOI: 10.1038/S41589-018-0080-X [retrieved on 2018-06-18] abstract -----	1-20, 24-38
Y	MEHMET FATIH BOLUKBASI ET AL: "Orthogonal Cas9-Cas9 chimeras provide a versatile platform for genome editing", NATURE COMMUNICATIONS, vol. 9, no. 1, 19 November 2018 (2018-11-19), XP055714079, DOI: 10.1038/s41467-018-07310-x figure 1 -----	1-20, 24-38

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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			US 2020263166 A1	20-08-2020
			WO 2017184786 A1	26-10-2017

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-20, 24-38(all partially)

relate to a system comprising as first Cas protein IscB and as second Cas protein Cas12a; the corresponding polynucleotide, vector, cell , organism and use.

2. claims: 1-19, 21-38(all partially)

relate to a system comprising the Cas protein IscB and the non-Cas protein Cas-associated transposase such as TnpA; the corresponding polynucleotide, vector, cell , organism and use.

3. claims: 1-20, 24-38(all partially)

relate to a system comprising as first Cas protein Cas9 and as second Cas protein Cas12a; the corresponding polynucleotide, vector, cell , organism and use.

4. claims: 1-19, 21-38(all partially)

relate to a system comprising the Cas protein Cas9 and the non-Cas protein Cas-associated transposase such as TnpA; the corresponding polynucleotide, vector, cell , organism and use.
