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(54) Title: SYSTEM FOR CAPTURING AND MODIFYING LARGE PIECES OF GENOMIC DNA AND CONSTRUCTING ORGANISMS WITH SYNTHETIC CHLOROPLASTS

(57) Abstract: The functional analysis of genes frequently requires the manipulation of large genomic regions. A yeast-bacteria shuttle vector is described that can be used to clone large regions of DNA by homologous recombination. Also described is a method for isolating entire genomes, including chloroplast genomes, or large portions thereof, and manipulating the same. Also described are methods for determining minimal genomes, minimal pathway requirements, and minimal organelle genomes.

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A. CLASSIFICATION OF SUBJECT MATTER

C12N 15/00(2006.01)i, C12N 15/09(2006.01)i, C07H 21/04(2006.01)i, C07K 14/52(2006.01)i

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)

IPC C12N 15/00, 15/09, 15/29, 15/82, CO7H 21/04, C07K 14/52, A01H 5/00

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)

eKIPASS(KIPO internal), PubMed(NCBI), JPO, USPTO, Google

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	
X	US 7,129,391 B1 (Henry Daniell) October 31, 2006.	44, 47-53, 56-63, 75,	
Y	See Abstract, Examples 1-16, column 16 line 34 - column 22 line 59	76, 87-90, 103 and 104 1-43, 45, 46, 54, 55, 64-74, 77-86, 91-102 and 105-131	
Y	US 5,866,404 A (M. Suzanne Bradshaw) February 2, 1999. See Abstract, column 3 line 12 - column 11 line 55	1-43, 45, 46, 54, 55, 64-74, 77-86, 91-102 and 105-131	
A		44, 47-53, 56-63, 75, 76, 87-90, 103 and 104	
A	M. Suzanns Bradshaw et al. 'A new vector for recombination-based cloning of large DNA fragmentsfrom yeast artificial chromosomes' Nucleic Acids Research, Vol. 23, No. 23, pp. 4850-4856, 1995. See Abstract, Pages 4850-4852(Matherial and methods)	1-131	
A	Delin Liang et al. 'Site-directed mutagenesis and generation of chimeric viruses by homologous recombination in yeast to facilitate analysis of plant-virus interactions' MPMI, Vol. 17, No .6, pp. 571-576, 2004. See Abstract, Fig. 1, Pages 575-576(Matherial and methods)	1-131	

		Further documents are	listed in the	continuation	of Box C.
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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 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 mailing of the international search report

Date of the actual completion of the international search
16 JUNE 2009 (16.06.2009)

17 JUNE 2009 (17.06.2009)

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2008/011540

Box No. II	Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)			
This internat	ional search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:			
1 1	ause they relate to subject matter not required to be searched by this Authority, namely:			
2 - Cla	iima Noa : 122-142			
∠ bec	aims Nos.: 132-143 cause they relate to parts of the international application that do not comply with the prescribed requirements to such an ent that no meaningful international search can be carried out, specifically:			
1:	The features of claims 132-143 seem to refer to claims 145, 148, 150, 151 and 155. But the claims 145, 148, 150, 151 and 55 are not existed. So, claims 132-143 are not clear.			
	nims Nos.: cause 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 Interna	tional Searching Authority found multiple inventions in this international application, as follows:			
	all required additional search fees were timely paid by the applicant, this international search report covers all searchable ims.			
	all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment any additional fee.			
	only some of the required additional search fees were timely paid by the applicant, this international search report covers y 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.:				
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.

Information on patent family members			US2008/011540
Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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