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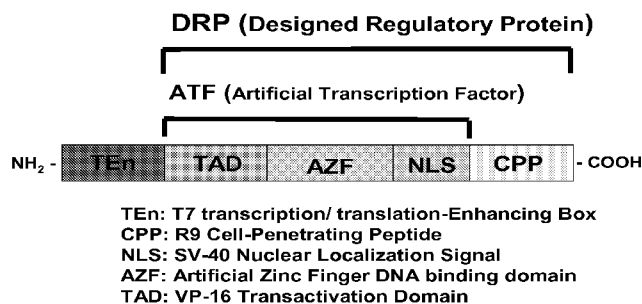
- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

25 November 2010

(54) Title: COMPOSITIONS AND METHODS FOR RE-PROGRAMMING AND RE-DIFFERENTIATING CELLS

Reprogramming DRPs (ReD proteins) of the invention



(57) Abstract: The invention provides compositions and *in vitro* and *ex vivo* methods for de-differentiating or re-programming mammalian cells. In alternative embodiments, the invention provides compositions comprising mixtures of Designed Regulatory Proteins (DRPs) or Reprogramming DRP protein (ReD) for de-differentiating or re-programming mammalian cells. The invention also provides compositions and methods for direct reprogramming of a first differentiated phenotype of a cell to a second differentiated phenotype.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/064132**A. CLASSIFICATION OF SUBJECT MATTER***C12N 15/63(2006.01)i, C12N 15/12(2006.01)i, C07K 14/47(2006.01)i, C07K 19/00(2006.01)i, C12N 5/071(2010.01)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)

C12N 15/63

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)

eKOMPASS(KIPO internal) & Keywords:designed regulatory protein (DRP), reprogramming DRP (ReD), zinc finger DNA binding, nuclear localization (NLP), cell penetrating (CPP), Oct4, Sox2, Klf4, c-Myc, Lin28, Nanog

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	TACHIKAWA, K. et al. Regulation of the endogenous VEGF-A gene by exogenous designed regulatory proteins. PNAS, 19 Oct. 2004, Vol. 101, No. 42, pp. 15225-15230.	1-9, 12-23, 34-43, 47, 49-65, 71
A	See the whole document, especially abstract, materials and methods.	72, 74-78
Y	SHI, Y. et al. Induction of pluripotent stem cells from mouse embryonic fibroblasts by Oct4 and Klf4 with small-molecule compounds.	1-9, 12-23, 34-43, 47, 49-65, 71
X	Cell Stem Cell, 06 November 2008, Vol. 3, pp. 568-574. See abstract, introduction.	72, 74-78
Y	DARIMONT, C. et al. SV40 T antigen and telomerase are required to obtain immortalized human adult bone cells without loss of the differentiated phenotype.	1-9, 12-23, 34-43, 47, 49-65, 71
A	Cell Growth & Differentiation, Feb. 2002, Vol. 13, pp. 59-67. See abstract and fig. 2	72, 74-78

☒ 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 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

28 SEPTEMBER 2010 (28.09.2010)

Date of mailing of the international search report

04 OCTOBER 2010 (04.10.2010)

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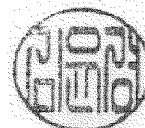
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2009/064132

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	MORI, T. et al. Modulation of endogenous FEGF-A expression under hypoxia by using artificial transcription factors. Nucleic Acids Symposium Series, 8 Sep. 2008, No. 52, pp. 187-188. See abstract and page 187, right column.	1-9, 12-23, 34-43, 47, 49-65, 71, 72, 74-78

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2009/064132**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.: 10,11,24,28-33,45,48,67,70,80,84,87-89
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 10,11,24,88,89 involve peptide sequences but the electronic files for said sequences were not provided upon the request.
Claims 28-33,45,48,67,70,80,84,87 are referring to the multiple dependent claims.
3. ☒ Claims Nos.: 25-27,44,46,66,68,69,73,79,81-83,85,86
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:

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 fee, this Authority did not invite payment of any additional fee.
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.:

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

Information on patent family members

International application No.

PCT/US2009/064132Patent document
cited in search reportPublication
datePatent family
member(s)Publication
date

None