



(51) International Patent Classification:

C12N 15/82 (2006.01) A01H 5/00 (2006.01)  
C07K 16/14 (2006.01)

(21) International Application Number:

PCT/EP2015/075800

(22) International Filing Date:

5 November 2015 (05.11.2015)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

14191959.7 5 November 2014 (05.11.2014) EP

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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, DK, DM,

DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,  
HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR,  
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, SM, ST, SV, SY, TH, TJ, TM, TN,  
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,  
TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,  
TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,  
DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,  
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,  
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,  
GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

Published:

— 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))  
— with sequence listing part of description (Rule 5.2(a))

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

23 June 2016



WO 2016/071438 A3

(54) Title: TRANSGENIC PLANT COMPRISING A POLYNUCLEOTIDE ENCODING A VARIABLE DOMAIN OF HEAVY-CHAIN ANTIBODY

(57) Abstract: The present invention relates to a transgenic plant or plant tissue. In particular, the present invention relates to a transgenic plant or plant tissue or plant cell comprising at least one polynucleotide comprising at least one sequence encoding a variable domain of a heavy-chain antibody (VHH) specifically binding to a sphingolipid of a fungus. Advantageously, the expression of the polynucleotide in at least part of the transgenic plant or plant tissue or plant cell (i) protects at least part of the transgenic plant or plant tissue or plant cell from an infection with a plant pathogenic fungus, (ii) inhibits the growth of a plant pathogenic fungus on at least part of the transgenic plant or plant tissue or plant cell, or (iii) increases the resistance of at least part of the transgenic plant or plant tissue or plant cell against a plant pathogenic fungus. The present invention also relates to a method for protecting at least part of a plant or plant tissue or plant cell from an infection with a plant pathogen, for inhibiting the growth of a plant pathogen on at least part of a plant or plant tissue or plant cell, or for increasing pathogen resistance of at least part of a plant or plant tissue or plant cell, comprising expressing in at least part of the plant or plant tissue or plant cell at least one polynucleotide encoding a VHH specifically binding to a pathogen.

INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2015/075800

A. CLASSIFICATION OF SUBJECT MATTER  
INV. C12N15/82 C07K16/14 A01H5/00  
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 C07K  
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, CHEM ABS Data, WPI Data, BIOSIS, Sequence Search, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2011/085070 A2 (VIRGINIA TECH INTELL PROP; TYLER BRETT; KALE SHIV) 14 July 2011 (2011-07-14) the whole document	1-18
Y	YU-CAI LIAO ET AL: "Plantibodies: A Novel Strategy to Create Pathogen-Resistant Plants", BIOTECHNOLOGY AND GENETIC ENGINEERING REVIEWS, vol. 23, no. 1, 1 December 2006 (2006-12-01), pages 253-272, XP055246669, GB ISSN: 0264-8725, DOI: 10.1080/02648725.2006.10648087 the whole document	1-18

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

"&" document member of the same patent family

Date of the actual completion of the international search  2 May 2016	Date of mailing of the international search report  12/05/2016
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  Puonti-Kaerlas, J

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2015/075800

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DA SILVA A F C ET AL: "Glucosylceramides in Colletotrichum gloeosporioides are involved in the differentiation of conidia into mycelial cells", FEBS LETTERS, ELSEVIER, AMSTERDAM, NL, vol. 561, no. 1-3, 12 March 2004 (2004-03-12), pages 137-143, XP004495466, ISSN: 0014-5793, DOI: 10.1016/S0014-5793(04)00156-5 the whole document	1-18
Y	LEONARDO NIMRICHTER ET AL: "Fungal Glucosylceramides: From Structural Components to Biologically Active Targets of New Antimicrobials", FRONTIERS IN MICROBIOLOGY, vol. 2, 1 January 2011 (2011-01-01), XP055132483, ISSN: 1664-302X, DOI: 10.3389/fmicb.2011.00212 the whole document	1-18
A	WO 2011/023522 A1 (FRAUNHOFER GES FORSCHUNG [DE]; SCHLEKER SYLVIA [DE]; PESCHEN DIETER [D]) 3 March 2011 (2011-03-03)	1-18
A	US 2011/165649 A1 (TYLER BRETT [US] ET AL) 7 July 2011 (2011-07-07)	1-18
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A	WO 03/089475 A2 (FRAUNHOFER GES FORSCHUNG [DE]; PESCHEN DIETER [DE]; FISCHER RAINER [DE]) 30 October 2003 (2003-10-30)	1-14
A	WO 96/09398 A1 (RIJKSLANDBOUWHOGESCHOOL [NL]; STICHTING TECH WETENSCHAPP [NL]; BAKKER) 28 March 1996 (1996-03-28)	1-14
A	WO 2012/025619 A1 (VIB VZW [BE]; UNIV BRUXELLES [BE]; JONGEDIJK ERIK [BE]; VERHEESEN PETE) 1 March 2012 (2012-03-01)	1-14
A	EP 1 118 669 A2 (UNILEVER PLC [GB]; UNILEVER NV [NL]) 25 July 2001 (2001-07-25)	1-14
8 2	X,P WO 2014/177595 A1 (AGROSAVFE N V [BE]) 6 November 2014 (2014-11-06) the whole document	1-14

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP2015/075800

## 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.:  
  
1-18(partially)
  
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.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

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

1. claims: 1-18(partially)

a plant expressing a polynucleotide comprising at least one sequence encoding a variable domain of a heavy-chain antibody (VHH) according to SEQ ID NO: 1

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2-84. claims: 1-18(partially)

as invention 1 but relating to SEQ ID NOs: 2-84

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2015/075800

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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WO 2011023522	A1	03-03-2011	AR 077952 A1 AU 2010288743 A1 CA 2754024 A1 EP 2478104 A1 RU 2011133912 A US 2012042416 A1 WO 2011023522 A1
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2015/075800

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		EP 2992100 A1	09-03-2016
		EP 2992101 A1	09-03-2016
		US 2016075769 A1	17-03-2016
		WO 2014177595 A1	06-11-2014
		WO 2014191146 A1	04-12-2014
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