

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
20 June 2002 (20.06.2002)

PCT

(10) International Publication Number
WO 2002/047537 A3

(51) International Patent Classification⁷: **A61K 09/00**,
C07K 7/00

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(21) International Application Number:
PCT/US2001/048157

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ,
DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,
TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(22) International Filing Date:
11 December 2001 (11.12.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/734,628 11 December 2000 (11.12.2000) US

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG).

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Published:

- *with international search report*
- *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments*

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(88) Date of publication of the international search report:
25 November 2004

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: COMPOSITIONS AND METHODS FOR IN SITU AND IN VIVO IMAGING OF CELLS AND TISSUES

(57) Abstract: The invention provides compositions and methods for imaging cells and tissues *in vivo* and *in situ*. Compositions and methods are provided for administration to enhance the imaging of cells and tissues by, e.g., computer assisted tomography (CAT), magnetic resonance spectroscopy (MRS), magnetic resonance imaging (MRI), positron emission tomography (PET), single-photon emission computed tomography (SPECT), or bioluminescence imaging (BLI). Thus, the invention provides compositions and methods for identifying sites of primary and metastatic tumors and tumor neovasculature.



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/48157

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61K 09/00; C07K 7/00

US CL : 424/192.1; 530327

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)

U.S. : 424/192.1; 530327

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)
MEDLINE, WEST and STN

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,180,084 B1 (RUOSLAHTI et al) 11 July 2000 (11.07.2000), column 25, lines 46-52).	1, 5-9 and 16, 18-20, 26-27, 35-36, 38-39 and 44
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Y		2-4, 17, 21-25, 28-34, 37, 40-43

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Further documents are listed in the continuation of Box C.

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See patent family annex.

* Special categories of cited documents:		"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
"A"	document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier application or patent published on or after the international filing date	"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
"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)	"&"	document member of the same patent family
"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		

Date of the actual completion of the international search

28 April 2004 (28.04.2004)

Date of mailing of the international search report

21 SEP 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US

Commissioner for Patents

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Alexandria, Virginia 22313-1450

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INTERNATIONAL SEARCH REPORT

International application No.

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Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim 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. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation 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 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.: 1-9 and 16-44 (SEQ ID NO:1)

Remark on Protest

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The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This International Search Authority has found 20 inventions claimed in the International Application covered by the claims indicated below:

1. Claims 1-9, and 16-44, drawn to a chimeric polypeptide molecule comprising RGD motif polypeptide comprises SEQ ID NO: 1 and pharmaceutical formulation thereof.
2. Claims 1-4, 10, 11, and 16-44, drawn to a chimeric polypeptide molecule comprising E-selectin binding polypeptide comprises SEQ ID NO: 2 and pharmaceutical formulation thereof.
3. Claims 1-4, 12, 13, and 16-44, drawn to a chimeric polypeptide molecule comprising MMP comprises SEQ ID NO:3 polypeptide and pharmaceutical formulation thereof.
4. Claims 1-4, and 14-44, drawn to a chimeric polypeptide molecule comprising proteoglycan binding polypeptide comprises SEQ ID NO: 4 and pharmaceutical formulation thereof.
5. Claims 1-4, and 15-44, drawn to a chimeric polypeptide molecule comprising proteoglycan binding polypeptide comprises SEQ ID NO: 5 and pharmaceutical formulation thereof.
6. Claims 45-50, drawn to a nucleic acid encoding chimeric RGD polypeptide comprises SEQ ID NO: 1, vector and host cells and pharmaceutical formulation thereof.
7. Claims 45-50, drawn to a nucleic acid encoding chimeric E-selectin polypeptide comprises SEQ ID NO: 2, vector and host cells.
8. Claims 45-50, drawn to a nucleic acid encoding chimeric MMP polypeptide comprises SEQ ID NO: 3, vector and host cells.
9. Claims 45-50, drawn to a nucleic acid encoding chimeric chondroitin sulfate proteoglycan polypeptide comprises SEQ ID NO: 4, vector and host cells.
10. Claims 45-50, drawn to a nucleic acid encoding chimeric chondroitin sulfate proteoglycan polypeptide comprises SEQ ID NO: 5, vector and host cells.
11. Claims 51-59, drawn to methods of *in situ* and *in vivo* imaging comprising RGD polypeptide comprises SEQ ID NO: 1 chimeric molecule.
12. Claims 51-59, drawn to methods of *in situ* and *in vivo* imaging comprising E-selectin binding polypeptide comprises SEQ ID NO: 2 chimeric molecule.
13. Claims 51-59, drawn to methods of *in situ* and *in vivo* imaging comprising MMP comprises SEQ ID NO: 3 chimeric molecule.
14. Claims 51-59, drawn to methods of *in situ* and *in vivo* imaging comprising chondroitin sulfate proteoglycan binding polypeptide comprises SEQ ID NO: 4 chimeric molecule.
15. Claims 51-59, drawn to methods of *in situ* and *in vivo* imaging comprising chondroitin sulfate proteoglycan binding polypeptide comprises SEQ ID NO: 5 chimeric molecule.
16. Claim 60, drawn to a method of screening comprising RGD binding polypeptide comprises SEQ ID NO: 1 chimeric molecule.
17. Claim 60, drawn to a method of screening comprising E-selectin binding polypeptide comprises SEQ ID NO: 2 chimeric molecule.
18. Claim 60, drawn to a method of screening comprising MMP binding polypeptide comprises SEQ ID NO: 3 chimeric molecule.

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19. Claim 60, drawn to a method of screening comprising chondroitin sulfate proteoglycan binding polypeptide comprises SEQ ID NO: 4 chimeric molecule.

20. Claim 60, drawn to a method of screening comprising chondroitin sulfate proteoglycan binding polypeptide comprises SEQ ID NO: 5 chimeric molecule.

The inventions listed as Group 1-20 do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group.

The specific technical feature of the Group 1 invention is the chimeric polypeptide molecule comprising RGD motif polypeptide comprises SEQ ID NO: 1 and pharmaceutical formulation thereof claimed therein while the specific technical feature of the Group 2 invention is the chimeric polypeptide molecule comprising E-selectin binding polypeptide comprises SEQ ID NO: 2 and pharmaceutical formulation thereof claimed therein.

The specific technical feature of the Group 3 invention is the chimeric polypeptide molecule comprising MMP comprises SEQ ID NO: 3 polypeptide and pharmaceutical formulation thereof.

The specific technical feature of the Group 4 invention is the chimeric polypeptide molecule comprising proteoglycan binding polypeptide comprises SEQ ID NO: 4 and pharmaceutical formulation thereof.

The specific technical feature of the Group 5 invention is the chimeric polypeptide molecule comprising proteoglycan binding polypeptide comprises SEQ ID NO: 5 and pharmaceutical formulation thereof.

The specific technical feature of the Group 6 invention is the nucleic acid encoding chimeric RGD polypeptide comprises SEQ ID NO: 1, vector and host cells and pharmaceutical formulation thereof.

The specific technical feature of the Group 7 invention is the nucleic acid encoding chimeric E-selectin polypeptide comprises SEQ ID NO: 2, vector and host cells.

The specific technical feature of the Group 8 invention is the nucleic acid encoding chimeric MMP polypeptide comprises SEQ ID NO: 3, vector and host cells.

The specific technical feature of the Group 9 invention is the nucleic acid encoding chimeric chondroitin sulfate proteoglycan polypeptide comprises SEQ ID NO: 4, vector and host cells.

The specific technical feature of the Group 10 invention is the nucleic acid encoding chimeric chondroitin sulfate proteoglycan polypeptide comprises SEQ ID NO: 5, vector and host cells.

The specific technical feature of the Group 11 invention is the methods of *in situ* and *in vivo* imaging comprising RGD polypeptide comprises SEQ ID NO: 1 chimeric molecule.

The specific technical feature of the Group 12 invention is the methods of *in situ* and *in vivo* imaging comprising E-selectin binding polypeptide comprises SEQ ID NO: 2 chimeric molecule.

The specific technical feature of the Group 13 invention is the methods of *in situ* and *in vivo* imaging comprising MMP comprises SEQ ID NO: 3 chimeric molecule.

The specific technical feature of the Group 14 invention is the methods of *in situ* and *in vivo* imaging comprising chondroitin sulfate proteoglycan binding polypeptide comprises SEQ ID NO: 4 chimeric molecule.

The specific technical feature of the Group 15 invention is the methods of *in situ* and *in vivo* imaging comprising chondroitin sulfate proteoglycan binding polypeptide comprises SEQ ID NO: 5 chimeric molecule.

The specific technical feature of the Group 16 invention is the method of screening comprising RGD binding polypeptide comprises SEQ ID NO: 1 chimeric molecule.

The specific technical feature of the Group 17 invention is the method of screening comprising E-selectin binding polypeptide comprises SEQ ID NO: 2 chimeric molecule.

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The specific technical feature of the Group 18 invention is the method of screening comprising MMP binding polypeptide comprises SEQ ID NO: 3 chimeric molecule.

The specific technical feature of the Group 19 invention is the method of screening comprising chondroitin sulfate proteoglycan binding polypeptide comprises SEQ ID NO: 4 chimeric molecule.

The specific technical feature of the Group 20 invention is the method of screening comprising chondroitin sulfate proteoglycan binding polypeptide comprises SEQ ID NO: 5 chimeric molecule.

Since the special technical feature of the Group 1 invention is not present in the Groups 2-20 claims and the special technical feature of the Groups 2-20 inventions are not present in the Group 1 claims, unity of invention is lacking.