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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, LT, 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.

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Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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))*

- (88) **Date of publication of the international search report:**
9 April 2015



WO 2015/023649 A3

(54) **Title:** PEPTIDES FOR ENHANCING TRANSDERMAL DELIVERY

(57) **Abstract:** Skin penetration enhancers comprising peptides are disclosed. Compositions comprising the skin penetration enhancers are also provided. The compositions further comprise an active agent, such as a pharmaceutically active agent, a vaccine, a cosmetic agent, and a nutritional supplement. Methods of transdermal ly delivering a pharmaceutically active agent, a vaccine, a cosmetic agent, or a nutritional supplement are also provided.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 14/50683

A. CLASSIFICATION OF SUBJECT MATTER
 IPC(8) - A61F 13/00, A61K 38/00 (2014.01)
 CPC - A61K 9/7084, A61K 38/00
 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(8): A61F 13/00, A61K 38/00 (2014.01)
 CPC: A61K 9/7084, A61K 38/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 USPC: 424/449, 514/1.2, 530/326 (keyword limited; terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 PubWEST (USPT, PGPB, EPAB, JPAB), Google Patents/Scholar
 Search Terms Used: Skin penetrating peptide, phage display, dermal, transdermal, SHS, GGGS, ACLPGVLGSC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2012/0128756 A1 (Hsu et al.) 24 May 2012 (24.05.2012) abstract, para [0008], SEQ ID NO: 3	1-4
A	US 2013/0108662 A1 (Brock et al.) 02 May 2013 (02.05.2013) para [0004], [0005], [0015], SEQ ID NO: 3	1-4
A	US 2007/0060512 A1 (Sadeghi et al.) 15 March 2007 (15.03.2007) para [0057], SEQ ID NO: 29	1-4

Further documents are listed in the continuation of Box C.

* 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 but 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 22 January 2015 (22.01.2015)	Date of mailing of the international search report 02 FEB 2015
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Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 14/50683

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.: 10-22
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:
This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I+: claims 1-9, drawn to a skin penetration enhancer comprising a peptide, wherein the peptide comprises an amino acid sequence comprising ten consecutive amino acid residues; eleven consecutive amino acid residues; or twelve consecutive amino acid residues; or analogs thereof. The first invention is restricted to SEQ ID NO: 1. Group I+ will be searched to the extent that it reads on SEQ ID NO: 1, without fee. It is believed that claims 1-4 read on this first named invention. Applicants must indicate, if applicable, the claims which read on the first named invention if different than what was indicated above for this group. Failure to clearly identify how any paid additional invention fees are to be applied to the "+" group(s) will result in only the first claimed invention to be searched/examined. An exemplary election would be: SEQ ID NO: 10 (claims 1-7).

---continued in extra 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 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.:
1-4 restricted to SEQ ID NO: 1

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.

PCT/US 14/50683

Continuation of

Box NO. III Observations where unity of invention is lacking

The inventions listed as Groups I+ do not relate to a single general 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:

Special Technical Features

The special technical feature of the inventions listed as Group I+ is the specific amino acid sequences recited therein. Each amino acid sequence is considered a distinct technical feature, because there is no significant structural similarities can readily be ascertained among these sequences.

Common Technical Features

The inventions of Groups I+ share the technical feature of a skin penetration enhancer comprising a peptide, wherein the peptide comprises an amino acid sequence comprising ten consecutive amino acid residues; eleven consecutive amino acid residues; or twelve consecutive amino acid residues; or analogs thereof. However, these shared technical feature do not represent a contribution over prior art in view of US 2012/0128756 A1 to Hsu et al. (hereinafter 'Hsu'). Hsu teaches a skin penetration enhancer comprising a peptide, wherein the peptide comprises an amino acid sequence comprising eleven consecutive amino acid residues; or analogs thereof (abstract, para [0008], for example SEQ ID NO: 13 comprises eleven consecutive amino acid residues). As said technical feature was known in the art at the time of the invention, this cannot be considered special technical feature that would otherwise unify the groups.

Groups I+ therefore lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.

Claims 10-22 have been held unsearchable because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).