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(54) Title: COMPOSITIONS COMPRISING SILK FIBROIN PARTICLES AND USES THEREOF

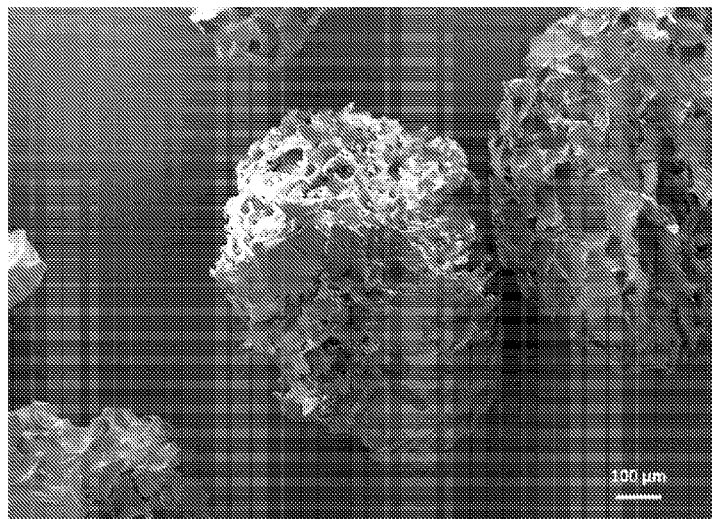


FIG. 2

(57) Abstract: Various aspects described herein relate to compositions comprising silk fibroin particles and methods of using the same, as well as devices and methods of delivering such compositions. The compositions described herein are suitable for injection into a site of defect in a soft tissue to provide bulking and/or augmentation effect to the soft tissue.



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).

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/059363**A. CLASSIFICATION OF SUBJECT MATTER****A61L 27/48(2006.01)i, A61L 27/20(2006.01)i, A61L 27/22(2006.01)i, C08L 5/08(2006.01)i, C08L 89/00(2006.01)i, C08K 7/22(2006.01)i, C08J 3/20(2006.01)i, C08J 3/24(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)

A61L 27/48; A61M 5/32; A61M 31/00; A61M 5/00; A61L 27/14; A61L 27/22; A61L 27/20; C08L 5/08; C08L 89/00; C08K 7/22; C08J 3/20; C08J 3/24

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: injectable composition, silk fibroin particles, cross-linked hyaluronic acid, delivery device

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|--|
| X A | WO 2013-071123 A1 (TRUSTEES OF TUFTS COLLEGE) 16 May 2013 See paragraphs [0029]-[0208]; claims 1-97; figures 1-8G. | 1-4, 6-14, 40-65, 67 , 87-89 121-148 |
| X | US 2003-0014010 A1 (CARPENTER, K. W. et al.) 16 January 2003 See paragraphs [0027]-[0069]; figures 1-6. | 121-136, 143-148 |
| X | US 2014-0135733 A1 (AMS RESEARCH CORPORATION) 15 May 2014 See paragraphs [0036]-[0071]; figures 2-20. | 121-127, 132-148 |
| X | US 2002-0143291 A1 (SLATER, R. C.) 03 October 2002 See paragraphs [0033]-[0041], [0052]-[0056]; figures 2-3B, 9, 10. | 121-127, 143-148 |
| A | KUNDU, B. et al., Silk fibroin biomaterials for tissue regenerations, 2013, Advanced Drug Delivery Reviews, Vol. 65, No. 4, pp 457-470 See the whole document. | 1-4, 6-14, 40-65, 67 , 87-89, 121-148 |

 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

19 February 2018 (19.02.2018)

Date of mailing of the international search report

19 February 2018 (19.02.2018)

Name and mailing address of the ISA/KR

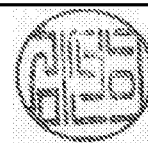
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2017/059363

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.: 15-39,68-86,90-120,149,150
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 15-39, 68-86, 90-120, 149 and 150 pertain to a method for treatment of the human body by surgery and thus relate to a subject matter which this International Searching Authority is not required, under PCT Article 17(2)(a)(i) and PCT Rule 39.1(iv), to search.
- 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.: 5,23,39,66
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:

Group I : Claims 1-4, 6-14, 40-65, 67 and 87-89 relate to a composition comprising a silk fibroin particle.

Group II : Claims 121-148 relate to a device for delivering a composition to a subject, comprising a hollow needle, outer and inner tubes and a handle.

- 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 any 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.:

- 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.

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Information on patent family members

International application No.

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