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(54) Title: STABILIZATION OF COLLAGEN SCAFFOLDS

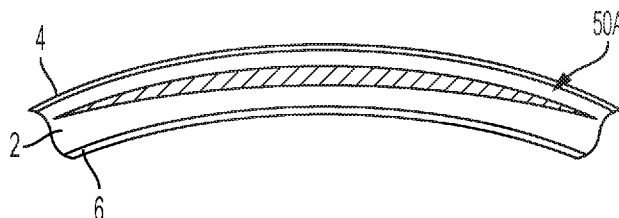


FIG. 5A

(57) Abstract: Shape-stabilized collagen scaffolds and methods of obtaining such stabilized scaffolds are disclosed. Stroma can be harvested, for example, from human or porcine corneal stroma. The stroma can be shaped during excision or in a separate step after excision. Following shaping (and preferably decellularization), the excised stroma portion is subject to pressure, force or vacuum to reduce fluid content and then irradiated or otherwise treated to induce crosslinking of collagen chains or fibrils. Various sources of energy can be employed to induce peptide bond crosslinking of collagen including, for example, ultraviolet (UV) radiation. The scaffolds can also be selectively densified or patterned. The invention is particularly useful in forming stable lenticules for intracorneal implantation in additive ocular surgery.



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2019/000779

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61F2/14
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)

A61F A61L

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2012/010728 A1 (SUN WENDELL [US] ET AL) 12 January 2012 (2012-01-12) paragraph [0005] - paragraph [0042] -----	1-56
X	US 4 793 344 A (CUMMING J STUART [US] ET AL) 27 December 1988 (1988-12-27) column 2, line 8 - column 2, line 18 -----	1-56
X	WO 2013/081943 A1 (UNIV CALIFORNIA [US]; MURPHY CHRISTOPHER J [US] ET AL.) 6 June 2013 (2013-06-06) paragraph [0004]; figure 4 -----	1-56

☐ 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

14 January 2020

Date of mailing of the international search report

20/03/2020

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2019/000779

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.:
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.:

1-56

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: 1-56

Collagenous lenticule for use as an implantable lenticule obtained from a dried, decelularized, cross linked ,formed scaffold from corneal donor source and method of forming it.

2. claims: 57-61

Storage container comprising to bodies and a cavity suitable at least partially radiation transmissive for sterilisation of a lenticule.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2019/000779

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012010728	A1	12-01-2012	
		AU 2011276246 A1	10-01-2013
		CA 2804592 A1	12-01-2012
		CA 3054722 A1	12-01-2012
		CN 103068413 A	24-04-2013
		EP 2590691 A1	15-05-2013
		EP 3581211 A1	18-12-2019
		JP 5967721 B2	10-08-2016
		JP 2013535240 A	12-09-2013
		US 2012010728 A1	12-01-2012
		US 2017100509 A1	13-04-2017
		WO 2012006390 A1	12-01-2012

US 4793344	A	27-12-1988	NONE

WO 2013081943	A1	06-06-2013	
		US 2014330374 A1	06-11-2014
		WO 2013081943 A1	06-06-2013
