

PROFILE OF FINAL REPORT PRGS

Project ID/Title:

PRGS16-002-0033

DEVELOPMENT OF
SONICATION DECELLULARIZATION PROTOTYPE
TO ENGINEER BIOSCAFFOLDS
FOR REGENERATIVE MEDICINE

Project Sponsor:

Ministry of Higher Education (MOHE)

Author Name(s): Assoc Prof Ir DrDr Azran Azhim Noor Azmi

Department/Kulliyah/Institute/Centre: Kulliyah of Allied Health Sciences IIUM

(A) Research Summary and Findings

The increasing number of arteries and organs needed for cardiovascular disease patients with end-stage organ failure has urged the need for tissue engineering. Decellularization of tissues or organs for the preparations of scaffolds has potential to preserve its original structure and ECM components (Fu et al., 2014). Recently, sonication decellularization technique has been established and proven to be able to prepare biological decellularized tissue efficiently. However, it resulted in incomplete decellularization, required long treatment time and caused alteration in biomechanical properties. We have successfully decellularized arterial tissue by sonication method in sodium dodecyl sulfate (SDS) solution disrupt of cell membrane (Norzarini et al., 2015). At low concentration of SDS, the process led to decellularized tissues with no cell remnants. In this study, it is hypothesized that the decellularized tissues have complete removal cell nuclei while maintaining similar extracellular matrix (ECM) composition, biological activity, and biomechanical integrity of the ECM. We characterize the biomaterial properties of the decellularized arterial tissue including free level of toxicity, extracellular matrix (collagen composition) and free from alpha-Gal antigen holds great potential in preparation of bioscaffolds. The outcomes will contribute to suggest the decellularized scaffolds having great potential for regenerative tissue/organ in the future.

i) Development of bioreactor and sample holder

OVERALL TANK SIZE : 380mm X 280mm X350mm (LxWxD)
INTERNAL TANK SIZE : 300mmX 200mmX300mm (LxWxD)

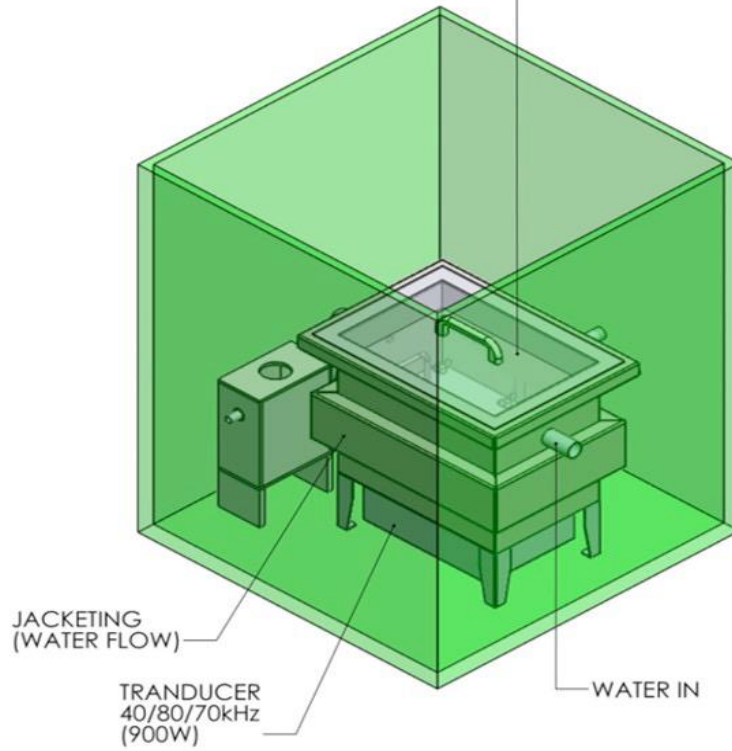


Figure 1. Design of bioreactor and sample holder

ii) Development of sonication decellularization prototype (Automation of prototype & Sensing and real-time monitoring)



Figure 2 Finished Prototype

(B) Financial Report and Asset Report

FINANCIAL SUMMARY DETAILS

Project ID	PRGS16-002-0033
Title	Development of Sonication Decellularization Prototype to Engineer Bioscaffolds for Regenerative Medicine
Kulliyah	Kulliyah of Science
Duration	24

Researchers	
ASSOC. PROF. DR. Azran Azhim b. Noor Azmi (7380)	Principal
DR. Munirah Binti Sha'Ban (6006)	Co-Researcher

Fund Summary

Vote Code	Description	Initial Allocation (RM)	Current Allocation (RM)	Disburse (RM)	Committed (RM)	Balance (RM)
V11000	Research Assistant (RA)	36,000.00	23,000.00	24,408.00	0.00	-1,408.00
V21000	Travelling Expenses And Subsistence	10,000.00	10,000.00	10,000.00	0.00	0.00
V22000	Transportation of goods	0.00	0.00	0.00	0.00	0.00
V23000	Communication and Utilities	0.00	0.00	0.00	0.00	0.00
V24000	Rental	5,000.00	5,000.00	1,918.00	0.00	3,082.00
V26000	Supply of Raw Materials For Repair & Maintenance	0.00	0.00	0.00	0.00	0.00
V27000	Research Materials & Supplies	100,000.00	100,000.00	97,091.81	0.00	2,908.19
V28000	Maintenance services	5,000.00	5,000.00	4,996.80	0.00	3.20
V29000	Professional Services & Other Services including Printing & Hospitality, Honorarium for subjects	15,000.00	28,000.00	25,103.44	0.00	2,896.56
V35000	Equipment	45,000.00	45,000.00	47,938.32	0.00	-2,938.32
V36000	Miscellaneous Research Advancement	0.00	0.00	0.00	0.00	0.00
V37000	Travelling Research Advancement	0.00	0.00	0.00	0.00	0.00
Total		216,000.00	216,000.00	211,456.37	0.00	4,543.63

Fund Received Detail

Receive Date	Description	Receipt No	Total	Vote Code
25-10-2016	PERUNTUKAN GERAN PRGS FASA 1/2016	CM13016000424	216,000.00	E14103
Total Fund Receive			216,000.00	

Assets

New Asset

-  Overview
-  Progress Summary
-  Finance
-  Research Activities
-  Awards
-  Intellectual Property
-  Products
-  Talents
-  Assets

Sonication Decellularization Prototype	
Type of Asset	Physical Asset - Machinery
Brand of Asset	Custom made
Cost of Asset (RM)	200,000.00
Asset Serial Number	R-GR13018000033-A00001
Equipment Serial Number	
Date of Procurement	20/11/2017
RMC Verification	
<input type="button" value="Edit"/> <input type="button" value="Delete"/>	

(C) Outputs

I) Prototype (Video Presentation)

Please find the attachment in Appendix 1

II) Intellectual Property

Please find the attachment in Appendix 2

III) Commercialization Outputs

For pre-commercialization of the prototype, further pre-clinical and clinical studies are needed to verify the prototype system to be fit for bioscaffolds preparations. Thus, there is still a long way to go until this prototype is ready to be used in bioscaffolds production. Nevertheless, in the short run, the sonication wave technology that is adapted in this system could benefit the cleaning and sterilization practices in many hospitals and research institutes labs. Thus, the “Sonication Decellularization System” hold immense potential to be pre-commercialized into industrial application serving in advanced cleaning system which is not only time saving, but also a more hygienic and cost effective approach in sterilization. Currently, we have few existing collaborators which are Sonictron SDN. BHD, Mediprotech (M) SDN. BHD, The University of Tokyo and Korea Institute of Science and Technology. In addition, the prototype has been patented and filed at PT/5600/UIAM-AZLAN/15.

APPENDIX I

APPENDIX II



PERBADANAN HARTA INTELEK MALAYSIA
INTELLECTUAL PROPERTY CORPORATION OF MALAYSIA
(Agensi di bawah KPDNKK)
Unit 1-7 & Mezzanine, Aras 12-19
Tower B, Menara UOA Bangsar,
No. 5, Jalan Bangsar Utama 1
59000 KUALA LUMPUR
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CERTIFICATE OF FILING

APPLICANT : INTERNATIONAL ISLAMIC UNIVERSITY
MALAYSIA
APPLICATION NO : PI 2017700851
REQUEST RECEIVED ON : 13 MARCH 2017
FILING DATE : 13 MARCH 2017
AGENT'S/APPLICANT'S FILE REF. : PT/5600/UIAM-AZRAN/15

Please find attached, a copy of the Request Form relating to the above application, with the filing date and application number marked thereon in accordance with Regulation 25(1).

Date : 17 MARCH 2017

(NOORHISHAM BIN OTHMAN)
For Registrar of Patents
✉ noorhisham@myipo.gov.my
☎ 03 - 22998812

To : LOK CHOON HONG
C/O PINTAS IP GROUP SDN. BHD.,
NO. 19, JALAN SS 1/36, PETALING JAYA
47300 SELANGOR DARUL EHSAN
MALAYSIA

FF 09(u)online

(Agensi di bawah Kementerian Perdagangan Dalam Negeri, Koperasi dan Kepenggunaan)



Patents Form No.1 PATENTS ACT 1983 REQUEST FOR GRANT OF PATENT (Regulations 7(1)) To: The Registrar of Patents Patents Registration Office Kuala Lumpur, Malaysia	For Official Use APPLICATION NO: PI 2017700851 Filing Date: 13/03/2017 Fee received on: 13/03/2017 Amount: RM400
Please submit this Form in duplicate together with the prescribed fee	Applicant's file reference: PT/5600/UIAM-AZLAN/15

THE APPLICANT(S) REQUEST(S) THE GRANT OF A PATENT IN RESPECT OF THE FOLLOWING PARTICULARS:
 I. TITLE OF INVENTION: **IMPROVEMENT IN METHOD AND APPARATUS FOR DECELLULARIZING BIOLOGICAL TISSUE**

II. APPLICANT(S) (the data concerning each applicant must appear in this box or , if the space insufficient, in the space below):

Name: **INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA**
 I.C./Passport No:
 Address: **INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA, P.O. BOX 10 50728 WILAYAH PERSEKUTUAN KUALA LUMPUR MALAYSIA**
 Nationality:

Address for service in Malaysia: **C/O PINTAS IP GROUP SDN. BHD., NO. 19, JALAN SS 1/36, PETALING JAYA 47300 SELANGOR DARUL EHSAN MALAYSIA**

* Permanent resident or principal place of business:

Telephone Number (if any) Fax Number (if any) Additional Information (if any)

Additional Information (if any)

III. INVENTOR:

Applicant is the inventor: Yes No

If the applicant is not the inventor

Name: **Azran Azhim NOOR AZMI**

Address: **No. 10, IM2/81, Bandar Indera Mahkota 2 25200 Kuantan PAHANG MALAYSIA**

Applicant is the inventor: Yes No

If the applicant is not the inventor

Name: **Munirah SHA '8#039BAN**

Address: **228 (F) Lepar Hilir 01 26300 Gambang PAHANG MALAYSIA**

A statement justifying the applicant's to the patent accompanies this Form

Yes No

Additional Information (if any)

IV. AGENT OR REPRESENTATIVE:

Applicant has appointed a patent agent in accompanying Form No. 17 Yes No

Agent Registration No:

Applicant has appointed to be their representative: **LOK CHOON HONG**

V. DIVISIONAL APPLICATION:

This application is a divisional application

The benefit of the filing date priority date

of the initial application is claimed in as much as the subject-matter of the present application is contained in the initial application identified below :

Initial Application No:

Date of filing of initial application:

Additional Information (if any)

VI. DISCLOSURE TO BE REGARDED FOR PRIOR ART PURPOSES:

(a) Disclosure was due to acts of applicant or his predecessor in title

Date of disclosure:

(b) Disclose was due to abuse of rights of applicant or his predecessor in title

Date of disclosure:

A statement specifying in more detail the facts concerning the disclosure accompanies this Form.

Yes No

Additional Information (if any)