



**YENEPOYA**

(DEEMED TO BE UNIVERSITY)  
Recognized under Sec 3(A) of the UGC Act 1956  
Accredited by NAAC with 'A' Grade

## Details of the Collaborative Activity

2017-18

**Name of the Collaborating Institute:** Gayatri Vidya Parishad College of Engineering,  
Madhurawada, Visakhapatnam, Andhra Pradesh

**Name of the Collaborating Department with YDU:** Yenepoya Research Center (YRC)

**Joint Research Project approved from DST-SERB:**

**Title of the Project:** Differentiation of human pluripotent stem cells into functional  $\beta$  islets using bioactive lipids for mutual development of biosensors with modern electronics techniques”

**Funding:** DST-SERB -2017-2021

ATTESTED

Dr. Mangadhara Somayaji K S  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

Final project letter  
copy

**Certificate from the Investigators (PI and Co-PIs)**

**Project Title: Differentiation of human pluripotent stem cells into functional  $\beta$  islets using bioactive lipids**

It is certified that

1. The same project proposal has not been submitted elsewhere for financial support.
2. We/I undertake that spare time on equipment procured in the project will be made available to other users.
3. We/I agree to submit a certificate from Institutional Biosafety Committee, if the project involves the utilization of genetically engineered organisms. We/I also declare that while conducting experiments, the Biosafety Guidelines of Department of Biotechnology, Department of Health Research, GOI would be followed in toto.
4. We/I agree to submit ethical clearance certificate from the concerned ethical committee, if the project involves field trails/experiments/exchange of specimens, human & animal materials etc.
5. The research work proposed in the scheme/project does not in any way duplicate the work already done or being carried out elsewhere on the subject.
6. We/I agree to abide by the terms and conditions of SERB grant.

Name and signature of Principal Investigator: Dr Bipasha Bose

*Bipasha Bose*

Date: July 28, 2016

Place: Mangalore

Name and signature of Co-PI (s) (if any): Co-PI 1- Dr Sudheer Shenoy P

*Sudheer*

Date: July 28, 2016

Place: Mangalore

Co-PI 2 Prof. U N Das

*U N Das*

Date-July 28, 2017

Place: Vishakhapatnam

*ls*  
ATTESTED

Dr.Gangadhara Somayaji K.S.  
Registrar  
Yeneppaya (Deemed to be University)  
University Road, Beralakatta  
Mangalore- 575 018, Karnataka

**Duration :** 36 MONTHS **Contact No :** +919449800403  
**Date of Birth :** 02-Apr-1972  
**Nationality :** INDIAN **Total Cost (INR) :** 67,14,600

**Project Summary :**

Diabetes is one of the pandemic disorders that is associated with renal, cardiac, hepatic neurological and vascular complications in the long run. Hence, functional  $\beta$  islet transplantation is a viable option for diabetes. Since there is an acute shortage of cadaveric  $\beta$  islets, attempts are being made to generate such  $\beta$  islets in demand by differentiating human pluripotent stem cells to  $\beta$  cells. In-vitro differentiation protocols available till date gave low yields of differentiated  $\beta$  cells along with a fraction of undifferentiated cells. Previously, we developed a differentiation protocol of human embryonic stem cells into functional  $\beta$  cells that were viable and functional for a long duration upon transplantation into diabetic mice. The proposed collaborator and others also showed that polyunsaturated fatty acids (PUFAs) participate in cell proliferation, differentiation and early embryogenesis. Hence, we propose to study the role of PUFAs and their metabolites on the proliferation and differentiation of human embryonic stem cells, especially into  $\beta$  cells.

**Objectives :**

- To study the effect of bioactive lipids such as linoleic acid (LA),  $\alpha$ -linolenic acid (ALA) and their metabolites on the survival and proliferation of human pluripotent stem (hPSCs) cells in vitro.
- To study the effect of bioactive lipids such as LA and ALA and their metabolites on spontaneous differentiation of hPSCs into embryoid bodies (EBs) and characterization for the presence of respective lineages.
- To explore the possibility that LA and ALA and their metabolites such as lipoxin A4 (LXA4) may have the potential to improve the efficiency of  $\beta$  cell differentiation of hPSCs.
- To evaluate glucose-stimulated insulin (GSI) release capabilities of such  $\beta$  cells obtained from the differentiation of human embryonic stem cells- in vitro functional assays.

**Keywords :**

Pluripotent stem cells, Embryonic stem cells, Pancreatic differentiation, Bioactive lipids, Cell therapy for diabetes

**Expected Output and Outcome of the proposal :**

We expect to achieve a high percentage of intermediate precursors, as well as, functional  $\beta$  cells respectively upon addition of various doses of polyunsaturated fatty acids/bioactive lipids in various steps of the differentiation protocol. Finally, the differentiated beta islets will be subjected to in-vitro functional validation. Upon successful completion, this study will make the basis of further work for in-vivo functional validation of the generated beta islets in preclinical mouse models of diabetes. In terms of workforce training, one junior research fellow will receive his/her training thereby contributing to the skilled workforce in the scientific community. Thirdly, 2-3 publications in International Journals of impact factor 2-5 are expected out of this study.

**Any other relevant information:**

Not Applicable

**Theme of Proposed Work:**

Health

**ATTESTED**  
  
Dr. Gangadhara Somayaji K.S.  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore- 575 018, Karnataka

**Collaboration Details for last 5 Years :**

**Planned Collaboration for the proposed work with any foreign scientist/ institution ?**

**No**

SNo.	CO-PI Details
	Undurti Das

FILE NO. EMR/2017/003114  
SCIENCE & ENGINEERING RESEARCH BOARD(SERB)  
(a statutory body of the Department of Science & Technology, government of India)

5 & 5A, Lower Ground Floor  
Vasant Square Mall  
Plot No. A, Community Centre  
Sector-B, Pocket-5, Vasant Kunj  
New Delhi-110070

Dated: 19-Dec-2018

**ORDER**

Subject: Financial Sanction of the research project titled "Differentiation of human pluripotent stem cells into functional  $\beta$  islets using bioactive lipids" under the guidance of Dr. Bipasha Bose, Yenepoya Research Centre, Yenepoya University, University road, deralakatte, mangalore, karnataka, Mangalore, Karnataka-575018 and by Dr. Undurti N Das, Director And Professor, BioScience Research CentreB, Gayatri Vidya Parishad College Of Engineering(Autonomous) and by Dr. Sudheer P Shenoy, Assistant Prof, Yenepoya Research Centre, Yenepoya University - Release of 1st grant.

Sanction of Science and Engineering Research Board (SERB) is hereby accorded to the above mentioned project at a total cost of Rs. 5311600/- (Rs. Fifty Three Lakh Eleven Thousand Six Hundred Only) with break-up of Rs. 1500000/- under Capital (Non-recurring) head and Rs. 3811600/- under General (Recurring) head for a duration of 36 months. The items of expenditure for which the total allocation of Rs. 5311600/- has been approved are given below:  
The following budget may be considered for Yenepoya University, University Road, Deralakatte, Mangalore, Karnataka

S. No	Head	Total (in Rs.)
A	Non-recurring	
1	Equipment -> Fluorescent microscope	1500000
A'	Total (Non-Recurring)	1500000
B	Recurring Items	
1	Recurring - I: (Manpower)	1029600
	Recurring - II: ( Consumables, Travel, Contingencies)	2900000
2	Recurring - III: (Overhead Charges)	482000
B'	Total (Recurring)	3811600
C	Total cost of the project (A' + B')	5311600

2. Sanction of the SERB is also accorded to the payment of Rs. 1500000/- (Rupees Fifteen Lakh only) under 'Grants for creation of capital assets' and Rs. 1100000/- (Rupees Eleven Lakh only) under 'Grants-in-aid General' to Registrar, Yenepoya University, University Road, Deralakatte, Mangalore, Karnataka being the first installment of the grant for the year 2018-2019 for implementation of the said research project.

3. The expenditure involved is debitable to Fund for Science & Engineering Research (FSER)  
This release is being made under Core Research Grant. (PAC Health Sciences)

4. The Sanction has been issued to Yenepoya University, University Road, Deralakatte, Mangalore, Karnataka with the approval of the competent authority under delegated powers on 18 December, 2018 and vide Diary No. SERB/F/10109/2018-2019 dated 18 December, 2018

5. Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website ([www.serb.gov.in](http://www.serb.gov.in)).

6. Overhead expenses are meant for the host Institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.

7. While providing operational flexibility among various subheads under head Recurring-II, it should be ensured that not more than Rs. 1.5 lakh each should be spent for travel and contingency.

8. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority/audit whenever the institute is called upon to do so.

9. The sanctioned equipment would be procured as per GFR and its disposal of the same would be done with prior approval of SERB.

10. The release amount of Rs. 2600000/- (Rupees Twenty Six Lakh only) will be drawn by the Under Secretary of the SERB and will be disbursed by means of RTGS transaction as per their Bank details given below:

Account Name	YENEPOYA RESEARCH CENTRE
Account Number	182701011001151

**ATTESTED**

**Dr. Gangadhara Somayaji K S**  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

FILE NO. EMR/2017/003114  
SCIENCE & ENGINEERING RESEARCH BOARD(SERB)  
(a statutory body of the Department of Science & Technology, government of India)

5 & 5A, Lower Ground Floor  
Vasant Square Mall  
Plot No. A, Community Centre  
Sector-B, Pocket-5, Vasant Kunj  
New Delhi-110070

Dated: 29-Jun-2020

ORDER

Subject: Research project entitled "Differentiation of human pluripotent stem cells into functional  $\beta$  islets using bioactive lipids" under the guidance of Dr. Bipasha Bose, Yenepoya Research Centre, Yenepoya University, University road, deralakatte, mangalore, karnataka, Mangalore, Karnataka-575018 and by Dr. Sudheer P Shenoy, Associate Professor, Yenepoya Research Centre, Yenepoya University.

1. This is in continuation of SERB's sanction order No. "EMR/2017/003114" dated "19 December, 2018 " of Science and Engineering Research Board (SERB).
2. Sanction of the competent authority is hereby accorded to the payment of a sum of Rs. 800000/- (Rupees Eight Lakh only) under 'Grants-in-aid General' to Registrar, Yenepoya University, University Road, Deralakatte, Mangalore, Karnataka being the 3rd grant for the financial year 2020-2021 for implementation of the above said project.
3. Sanction of the competent authority is also accorded to the carry forward of unspent balance of Rs. 377129/- (Rupees Three Lakh Seventy Seven Thousand One Hundred and Twenty Nine only) ( Recurring Rs. 377129 and Non-Recurring Rs. 0 ) to Yenepoya University, University Road, Deralakatte, Mangalore, Karnataka from FY 2019-2020 to FY 2020-2021 for the same purpose for which it was sanctioned.
4. Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at the website (www.serb.gov.in).
5. It is certified that provision of GFR 212 relating to Utilization Certificates (Ucs) for the funds released under the grant have been satisfied and the UC/s is/are enclosed herewith.
6. The expenditure involved is debitable to Fund for Science & Engineering Research (FSER) This release is being made under Core Research Grant. (PAC Health Sciences)
7. The Sanction has been issued to Yenepoya University, University Road, Deralakatte, Mangalore, Karnataka with the approval of the competent authority under delegated powers on 20 June, 2020 and vide Diary No. SERB/F/972/2020-2021 dated 26 June, 2020
8. The release amount of Rs. 800000/- (Rupees Eight Lakh only) ( Recurring Rs. 800000 and Non-Recurring Rs. 0 ) will be drawn by the Under Secretary of the SERB and will be disbursed by means of RTGS transaction as per their Bank details given below:

PFMS Unique Code	YENEPOYAUNIV
Account Name	YENEPOYA RESEARCH CENTRE
Account Number	182701011001151
Bank Name & Branch	VIJAYA BANK Yenepoya University Branch, Yenepoya University Campus, Derlakatte, Mangalore-575018, Karnataka
IFSC/RTGS Code	VIJB0001827
Email id of A/C Holder	financeofficer@yenepoya.org
Email id of PI	Bipasha.bose@gmail.com

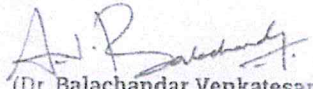
9. The institute will maintain separate audited accounts for the project. A part or whole of the grant must be kept in an interest earning bank account which is to be reported to SERB. The interest thus earned will be treated as credit to the institute to be adjusted towards further installment of the grant.
10. As per rule 211 of GFR the accounts of Grantee Institution shall be open to inspection by the sanctioning authority / audit whenever the institute is called upon to do so.
11. The institute will furnish to the SERB, Utilization certificate(separate for Recurring & Non-Recurring ) and an audited statement of accounts pertaining to the grant immediately after the end of each financial year.
12. After completion of the project unspent balance if any should be returned as Demand Draft drawn in favour of "Fund for Science and Engineering Research" payable at New Delhi.

**ATTESTED**

**Dr. Gangadhara Somayaji K S**  
Registrar  
Yenepoya (Deemed to be University)  
University Road, Deralakatte  
Mangalore 575 018, Karnataka.

13. The organization/institute/university should ensure that the technical support/financial assistance provided to them by the Science & Engineering Research Board, a statutory body of the Department of Science & Technology (DST), Government of India should invariably be highlighted/ acknowledged in their media releases as well as in bold letters in the opening paragraphs of their Annual Report.

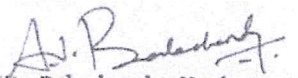
14. In addition, the investigator/host institute must also acknowledge the support provided to them in all publications, patents and any other output emanating out of the project/program funded by the Science & Engineering Research Board, a statutory body of Department of Science & Technology (DST), Government of India.

  
(Dr. Balachandar Venkatesan)  
Scientist E  
ms\_hs@serbonline.in

To,  
Under Secretary  
SERB, New Delhi

Copy forwarded for information and necessary action to: -

1.	The Principal Director of Audit, A.G.C.R. Building, IIIrd Floor I.P. Estate, Delhi-110002
2.	Sanction Folder, SERB, New Delhi.
3.	File Copy
4.	Dr. Bipasha Bose Yenepoya Research Centre Yenepoya University, University road, deralakatte, mangalore, karnataka, Mangalore, Karnataka-575018 Email: Bipasha.bose@gmail.com Mobile: 919449806403  Dr. Sudheer P Shenoy Yenepoya Research Centre Yenepoya University
5.	Registrar, Yenepoya University, University Road, Deralakatte, Mangalore, Karnataka

  
(Dr. Balachandar Venkatesan)  
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ATTESTED  


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