



Phone : 2350-5687,  
2354-3853  
Fax : (033)2350-5687

# RAMMOHAN COLLEGE

(Formerly City College W.Dept.)

102/1, Raja Rammohan Sarani, Kolkata – 700009

E-mail : [rmc.tic85b@yahoo.in](mailto:rmc.tic85b@yahoo.in), [rmc.principal@gmail.com](mailto:rmc.principal@gmail.com)

Accredited B<sup>++</sup> Grade by NAAC

Ref. ....

Date.....20

## Internship with National Institute of Cholera and Enteric Diseases: ICMR, Kolkata

राष्ट्रीय कॉलरा और आंत्र  
रोग संस्थान

(भारतीय आयुर्विज्ञान अनुसंधान परिषद्)



NATIONAL INSTITUTE OF CHOLERA  
AND ENTERIC DISEASES

(INDIAN COUNCIL OF MEDICAL RESEARCH)

WHO COLLABORATING CENTRE FOR RESEARCH AND TRAINING ON DIARRHOEAL DISEASES

पी-33, सी. आई. टी. रोड, स्किम - XM, बेलियाघाटा, कोलकाता-700 010, भारत  
P-33, C.I.T. Road, Scheme - XM, Beliaghata, Kolkata - 700 010, India.

Hemanta Koley MSc, PhD  
Scientist-D  
Division of Bacteriology

Date: 3<sup>rd</sup> May, 2017

### To Whom It May Concern

This to certify that Mr. Souvik Datta, student of M.Sc. in Human Physiology, Rammohan College under University of Calcutta, did his final year project work from 3<sup>rd</sup> April 2017 to 3<sup>rd</sup> May 2017 on "Studies on the immunogenicity and protective efficacy of non-typhoidal Salmonella derived Outer Membrane Vesicles in mice model" as his dissertation work for the partial fulfillment for the master degree in Human Physiology, under PhD student, Mr. Suhrid Maiti and my supervision.

In his project, he has worked on the immunogenic and protective roles of non-typhoidal salmonellae from two strains of *Salmonella enterica* serovar Typhimurium and Enteritidis. He has isolated Outer Membrane Vesicles (OMVs) from these two strains which are nano-spherical ultra-structure ranging in size from 70-200 nm. He has immunized mice with OMVs of these two strains and observed its immunogenic role by ELISA method. He also observed the protective role of OMVs by challenging OMV immunized mice with circulating homologous strains. He has used an intra-peritoneal mice model in his protection study. From the result of his work, he observed serum immunoglobulin level IgG, IgA has increased over the immunization period. He also found that OMVs from these NTS strains hinders bacterial invasion in large and small intestine and also protects the body from systemic infection.

Mr. Souvik Datta has successfully completed his project work. Other than his project work, he has learnt different techniques from our laboratory and has gained knowledge on diarrheal diseases through a series of lectures and demonstrations.

I shall be pleased to answer any queries concerning his research projects through my e-mail [hemantakoley@hotmail.com](mailto:hemantakoley@hotmail.com) and mobile number (+919831031307). I wish his success in all his future endeavors.

निदेशक / Director: 91-33-2363 3373, 2370 1176 पि. बी. एक्स / PBX: 91-33-2353 7469/7470, 2370 5533/4478/0448  
फैक्स / Fax: 91-33-2363 2398, 2370 5066, वेब / Website: www.niced.org.in



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## A PROJECT REPORT ON

DETECTION OF VIRAL RNA IN HCV SERO-REACTIVE  
THALASSEMIA SAMPLES

SUBMITTED BY

GARGI BYABARTA

STUDENT OF

RAMMOHAN COLLEGE

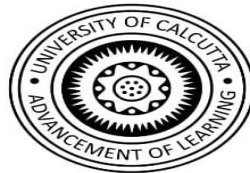
THE UNIVERSITY OF CALCUTTA

DEPARTMENT OF "PHYSIOLOGY" ( M.Sc.,4<sup>TH</sup> SEMESTER )

SPECIALIZATION IN "CLINICAL BIOCHEMISTRY,NUTRITION AND  
DIETETICS"

REGISTRATION NO: 137-1221-0644-14

ROLL NO .: RMC/PHY/17/02



UNDER THE GUIDANCE OF

DR. PROVASH CHANDRA SADHUKHAN

INDIAN COUNCIL OF MEDICAL RESEARCH , NICED, KOLKATA



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15  
YEARS OF  
CELEBRATING  
THE MAHATMA



भारतीय चिकित्सा परिषद्  
INDIAN COUNCIL OF MEDICAL RESEARCH  
NEW DELHI  
एन सी ई



icmr | NICED  
INDIAN COUNCIL OF  
MEDICAL RESEARCH | NATIONAL INSTITUTE OF  
CHOLERA AND ENTERIC DISEASES

**आई.सी.एम.आर. – राष्ट्रीय कॉलरा और आंत्र रोग संस्थान**  
**ICMR - NATIONAL INSTITUTE OF CHOLERA AND ENTERIC DISEASES**  
स्वास्थ्य अनुसंधान विभाग, स्वास्थ्य और परिवार कल्याण मंत्रालय, भारत सरकार  
Department of Health Research, Ministry of Health and Family Welfare, Govt. of India

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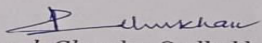
**CERTIFICATE**

*This is to certify that Miss Gargi Byabarta (Reg. No.- 137-1221-0644-14) studying M.Sc. in "Human Physiology" with specialization in "Clinical Biochemistry & Nutrition" at Rammohan College under University of Calcutta, has satisfactorily completed her Project work on "Detection of Viral RNA in HCV Sero-reactive Thalassemia samples". She has worked at ICMR-National Institute of Cholera and Enteric Disease, Kolkata, West Bengal under my guidance from 15<sup>th</sup> March to 16<sup>th</sup> April, 2019.*

*She has satisfactorily completed her project work and found to be sincere, hardworking and technically sound. Wish her all the best for future success.*

*Any project similar to this should be granted as a sheer coincidence.*

Date: 16. 04. 2019  
Place: Kolkata

Signature  
  
(Provas Chandra Sadhukhan)  
Scientist E  
डा: प्रभास चन्द्र साधुखान / Dr. Provas Chandra Sadhukhan  
(बैज्ञानिक-ई / Scientist-E)  
आई.सी.एम.आर. राष्ट्रीय कॉलरा और आंत्र रोग संस्थान  
ICMR-National Institute of Cholera and Enteric Diseases  
पी-३३, सी. आई. टी. रोड, स्कीम-१०एम, बेलियाघाटा  
P-33, C.I.T. Road, Scheme-XM, Beliaghata  
कोलकाता-७०० ०१० / Kolkata-700 010

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पी-३३, सी.आई.टी. रोड, स्कीम-१० एम, बेलियाघाटा, कोलकाता-७०००१०  
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## EMERGENCE AND REEMERGENCE OF EXTENDED SPECTRUM $\beta$ LACTAMASES – PRODUCING ENTERIC BACTERIA

REVIEW REPORT PRESENTED FOR PARTIAL FULFILMENT OF THE DEGREE OF M.Sc  
EXAMINATION, 2020  
IN  
HUMAN PHYSIOLOGY

SUBMITTED BY  
ROLL NO. – 113/HPY/181007  
REGISTRATION NO. – 026-1221-0055-15  
UNIVERSITY OF CALCUTTA

WITH SPECIALIZATION IN  
BIOCHEMISTRY

SUPERVISED BY  
DR. HEMANTA KOLEY  
SCIENTIST-E, DIVISION OF BACTERIOLOGY  
ICMR-NICED, KOLKATA



S Saengul  
Principal  
Rammohan College  
Kolkata-9