

Rahul Basu

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Date of Birth: 1988-11-01
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RESEARCH EXPERIENCES

1. Postdoctoral Visiting (RML-Beth) Fellow

PI (RML): Dr. Karin Peterson, Laboratory of Persistent Viral Diseases (from Oct, 2017- Sep, 2019).

Primary Project: Blood-Brain-Barrier (BBB) Breakdown during Encephalitic Virus Infection.
Others: Effects of small molecular drugs in neuronal cell lines during Zika virus infection.

PI (Bethesda): Dr. Iain Fraser, Laboratory of Immune System Biology (from Sep, 2019-current).

Project: Gene targeting to understand the mechanism of virus induced cerebrovascular leakage.

2. Ph. D.

Neurovirology division, Indian Institute of Science Education and Research-Kolkata, India
(January, 2012-June, 2017)

Graduate research with Dr. Jayasri Das Sarma, Professor, IISER-Kolkata.

Thesis title: Mouse Hepatitis Virus (MHV) induced remodeling of Gap Junction Intercellular Communication plays a major role in Demyelination.

Project 1. Alteration of astrocytic gap junction due to MHV infection in primary culture and *in vivo*, in a virus induced model of multiple sclerosis (MS).

Project 2. Alteration of oligodendrocytic gap junction and its role in demyelination.

Project 3. Impact of MHV infection on meningeal fibroblasts and gap junctions in blood-brain-barrier.

Project 4. Impact of MHV infection on cellular prion protein expression.

3. Other research experiences:

A. Du Pre grant, Multiple Sclerosis International Federation:

Perelman School of Medicine, University of Pennsylvania (August, 2012-October, 2012)

Principal investigator: Dr. Kenneth S. Shindler, associate professor, University of Pennsylvania.

Project: Effect of Resveratrol and BBI in Mouse Hepatitis Virus infection induced model of Optic Neuritis

B. M.Sc. thesis project:

Bose Institute, Kolkata (November, 2010-June, 2011)

Principal investigator: Prof. Amita Pal, Scientist-E, Bose Institute, Kolkata

Project: Subtractive Hybridization to develop ESTs for genes upregulated or downregulated in *Vigna mungo* (Mungbean) during infection of MYMI Virus.

C. Summer internship:

Department of Biological Sciences, Indian Institute of Science Education and Research-Kolkata, India (2010)

Principal investigator: Prof. Chanchal Das Gupta, Chair, Biological Sciences, IISER K.

Project: *In vitro* study of ribosome mediated protein folding

OTHER ACADEMIC QUALIFICATIONS:

2011 (August-December): Course work program, Department of Biological Sciences, Indian Institute of Science Education and Research Kolkata (IISER K)

2009-2011: M.Sc. in Biotechnology (integrated), St. Xavier's College (Autonomous), Kolkata (Division: 1st).

2006-2009: B.Sc. in Biotechnology (integrated), St. Xavier's College (Autonomous), Kolkata (Division: 1st).

2004-2006: Higher secondary education, West Bengal Council for Higher Secondary Education (Total marks: 89%).

2004: Secondary education, West Bengal Board of Secondary education (Total marks: 84.5%).

AWARDS AND HONORS:

2017-2020: RML-Beth Fellowship, Nation Institutes of Health, USA

- 2014-present:** Senior Research Fellowship (SRF), Council of Scientific and Industrial Research (CSIR), India
- 2012-2014:** Junior Research Fellowship (JRF), Council of Scientific and Industrial Research (CSIR), India
- 2014:** Best poster award, Indo-US symposium on Neurovirology, IISER-Kolkata & NBRC
- 2012:** Du Pré Grant, Multiple Sclerosis International Federation (MSIF)
- 2006:** Excellence in higher secondary examination, “Merit-cum-Means Scholarship Scheme”, Government of West Bengal, India

National level Examinations:

- 2010:** National Eligibility Test, CSIR-UGC, India. Rank: 129.
- 2011:** Graduate Aptitude Test for Engineering (GATE), India. Rank: 209 (98.4 Percentile).

PUBLICATIONS (PEER REVIEWED):

- 1. Rahul Basu**, Kaveri Banerjee, Abhishek Bose and Jayasri Das Sarma. Mouse Hepatitis Virus infection remodels Connexin43 mediated gap junction intercellular communication both *in vitro* and *in vivo*. **The Journal of Virology**. doi: 10.1128/JVI.02420-15.
(Contributions: Experimental design, experimental data generation, data analyses, manuscript writing)
- 2. Rahul Basu**, Abhishek Bose and Jayasri Das Sarma. Mouse Hepatitis Virus alters microtubule network assisted Connexin43 trafficking to the cell surface in primary astrocytes. **The Journal of Biological Chemistry**. doi: 10.1074/jbc.M117.786491.
(Contributions: Experimental design, experimental data generation, data analyses, manuscript writing)
- Abhishek Bose, **Rahul Basu** and Jayasri Das Sarma. Loss of Cx43-Mediated Functional Gap Junction Communication in Meningeal Fibroblasts Following Mouse Hepatitis Virus Infection. **Molecular Neurobiology**. doi: 10.1007/s12035-017-0861-3.
(Contributions: Establishment of model, experimental data generation, data analyses)
- 4. Rahul Basu** and Jayasri Das Sarma. Connexin 43/47 channels are important for astrocyte/oligodendrocyte cross-talk in myelination and demyelination. **Journal of Biosciences**. doi: 10.1007/s12038-018-9811-0.

(**Contributions:** Literature search, manuscript writing)

5. Rahul Basu and Jayasri Das Sarma. Panglial gap junction intercellular communication in neuroinflammatory demyelination and dysmyelination. Book chapter, accepted October, 2019.

6. Soumen Jana, Madhurima Chatterjee, Damayantee Das, **Rahul Basu** and Jayasri Das Sarma. Mouse Hepatitis Virus alters cellular prion protein expression. Manuscript under review.

(**Contributions:** Experimental data generation *in vivo*, data analyses)

MANUSCRIPT UNDER PREPARATION:

Age-dependent differential response of mouse brain capillary endothelial cells in La Crosse La Crosse Virus infection.

Expression Sequence Tag (EST) database entry (NCBI):

Kundu, A., Paul, S., **Basu, R.**, Pal, A. ESTs submitted in SSH library of MYMIV infected *Vigna mungo* (T9).

PUBLISHED ABSTRACTS, ORAL AND POSTER PRESENTATIONS:

1. Rahul Basu, Kaveri Banerjee, Anjali Pathania and Jayasri Das Sarma. Mouse Hepatitis Virus infection in primary astrocyte alters Connexin 43 localization. Frontiers in Modern Biology, IISER K, 2012 (Poster presentation).

2. Rahul Basu, Kaveri Banerjee, and Jayasri Das Sarma. Connexin 43 is retained in an intracellular compartment due to Mouse Hepatitis Virus infection in primary astrocytes. Frontiers in Modern Biology, IISER K, 2013(Poster presentation).

3. Rahul Basu, Kaveri Banerjee, and Jayasri Das Sarma. MHV-A59 infection remodels Cx43 expression and function *in vivo* and *in vitro*. Indo-US symposium on Neurovirology, IISER-Kolkata & NBRC, 2014(Poster presentation, abstract published. Awarded as best poster).

4. Kaveri Banerjee, **Rahul Basu** and Jayasri Das Sarma. MHV-A59 induced alteration of gap junctions in meningeal fibroblasts. Indo-US symposium on Neurovirology, IISER-Kolkata & NBRC, 2014(Poster presentation).

5. Rahul Basu, Kaveri Banerjee and Jayasri Das Sarma. Connexin43 is retained in an intracellular compartment by a microtubule-dependent mechanism due to MHV-A59

infection in astrocytes. Second international conference on Advanced Studies on Cell Signaling Network (CESIN), IICB, 2014(Poster presentation).

6. Rahul Basu, Abhishek Bose and Jayasri Das Sarma. MHV-A59 infection induced depletion of astrocytic and oligodendrocytic gap junction proteins might play a major role in chronic stage demyelination. The XXXIX All India Cell Biology Conference on Cellular Organization and Dynamics, 2015 (Oral presentation).

7. Rahul Basu, Kaveri Banerjee, Abhishek Bose and Jayasri Das Sarma. Coronavirus infection alters Cx43 expression and function in CNS: a link to demyelination. *Biologia*, Annual meeting of Dept of Biological Sciences, IISER-Kolkata, 2015 (Invited talk).

8. Abhishek Bose, **Rahul Basu** and Jayasri Das Sarma. Alteration of Cx43 in meningeal fibroblasts upon MHV-A59 infection. *Frontiers in Modern Biology*, IISER K, 2015 (Poster presentation).

9. Soumen Jana, Madhurima Chatterjee, Damayanti Das, **Rahul Basu** and Jayasri Das Sarma. Cellular prion protein expression is altered in a viral model of multiple sclerosis. The XXXIX All India Cell Biology Conference on Cellular Organization and Dynamics, 2015 (Poster presentation).

10. Rahul Basu, Abhishek Bose and Jayasri Das Sarma. Microtubule-dependent altered trafficking of astrocytic Connexin43 is associated with oligodendrocytic gap junction alteration and loss of myelin. Indo-US symposium on Neurovirology, IISER-Kolkata, 2016(Poster presentation).

10. Abhishek Bose, **Rahul Basu** and Jayasri Das Sarma. Mechanistic aspects of MHV-A59 induced intracellular retention of Connexin 43. Indo-US symposium on Neurovirology, IISER-Kolkata, 2016(Oral presentation).

11. Rahul Basu, Abhishek Bose and Jayasri Das Sarma. Cx43/Cx47 axis in MHV-A59 induced viral model of demyelination. *Advances of life Sciences*, IISER-Kolkata, 2016(Poster presentation).

12. Rahul Basu, Clayton Winkler and Karin E. Peterson. The age dependent response of Brain Capillary Endothelial Cells during La Crosse Virus infection. *Cerebral vascular biology conference*, 2019.

TEACHING EXPERIENCE

2013-2016 (Aug-Dec session): Teaching assistantship for practical course on Histopathology and Immunological techniques, BS-MS

and Post Bachelor Integrated Ph.D. program, IISER-Kolkata

Mentored several summer students/project fellows during PhD tenure.

Name	Period	Project
Anjali Pathania	01/2013-06/2013 (MS student)	Alteration of Cx43 in MHV infected primary astrocytes
Kaveri Banerjee	08/2013-06/2014 (Integrated Ph.D. student)	Alteration of Cx43 in MHV infected mice and meningeal fibroblasts
Vijeeth AR	04/2014-06/2014 (Summer trainee)	Mechanism of virus induced Cx43 alteration in astrocytes
Abhishek Bose	08/2014-06/2016 (Integrated Ph.D. student)	Mechanism and importance of Cx43 and Cx47 alteration in glial cells in culture and <i>in vivo</i>

TECHNICAL EXPERTISE:

Primary culture techniques: Establishment of endothelial cell culture, mixed glial culture from neonatal mouse brain, enrichment for astrocyte and microglia culture, enrichment for meningeal fibroblast culture, primary oligodendrocyte culture.

***In vivo* experimental techniques:** Intraperitoneal and intracranial injections, gavage feeding, tissue harvesting, protein and RNA isolation from organs, paraffin and cryosectioning.

Histopathology: Immunohistochemistry, Hematoxylin and Eosin staining, LFB staining, *in vivo* immunofluorescence.

Cell and molecular biology: Cell culture, virus infection, plaque assay, FACS, immunofluorescence, protein and RNA extraction, cDNA synthesis, cDNA library preparation, co-immunoprecipitation, western blot, real-time PCR, cell fractionation, DNA sequencing, Lentiviral vector

preparation, siRNA-based gene targeting and library preparation.

Biostatistics:

SD, SEM, Two group and three group comparisons.

Professional references:

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Rocky Mountain Laboratories, NIAID/DIR
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