

Dr. Atrayee Basu, PhD (Curriculum Vitae)

CONTACT INFORMATION

🏠 Room 225, Yale School of Medicine
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Website

EDUCATION

National Brain Research Centre, Manesar, Haryana, India

Integrated PhD Student, Department of Cellular and Molecular Neuroscience,

August 2013- January 2022

- Advised by: **Dr Anindya Ghosh Roy**

MSc in Neuroscience, National Brain Research Centre,

August 2013 - July 2014

Calcutta University, Lady Brabourne College, Kolkata, West Bengal, India,

BSc in Microbiology (Honours), Physics and Chemistry (Pass) 2010 - 2013

Bidya Bharati Girls' High School, Kolkata, West Bengal, India

Higher Secondary, July 2008 - May 2010

Secondary, April 1995 - April 2008

RESEARCH EXPERIENCE

Yale School of Medicine, Neuroscience Dept, 100 College St, New Haven, CT, USA, 06510

Postdoctoral Associate

February 2022 - Present

Supervised by: **Dr. Stephen Strittmatter, MD, PhD**

National Brain Research Centre, Manesar, Haryana, India

Senior Research Fellow

August 2015 - January 2022

Junior Research Fellow

August 2014 - July 2015

Supervised by: **Dr. Anindya Ghosh Roy**

NEUROSCIENCE
COURSEWORK
SUBJECTS

Developmental Neuroscience, Neuroanatomy, Neurochemistry, System Neuroscience, Biophysics, Genetics Computational Neuroscience, Cognitive Neuroscience, Biostatistics, Cellular and Molecular Biology and Biochemistry

August 2013 - July 2014

PH.D THESIS

Study of neuronal rewiring after injury using *Caenorhabditis elegans*.

As a graduate researcher, I set out to investigate whether axon regeneration following injury in adulthood leads to functional recovery in *Caenorhabditis elegans* model. I have also addressed the molecular and cellular basis of functional recovery. I have used mechanosensory neuron involving touch sensation as the model. I showed that a self-fusion mechanism between the neuron's severed proximal and distal part during regeneration leads to a quick functional repair and this phenomenon is regulated by a highly conserved miRNA *let-7*.

In a separate story, I found that DAF-16/ FOXO transcription factor in Insulin/IIS signalling regulates guidance of the regrowing axon towards its proper postsynaptic target in both cell-autonomous and non-autonomous manner.

PUBLICATIONS

- **Atrayee Basu**, Shirshendu Dey, Nilanjana Das, Dharmendra Puri, Prerna Srivastava, Pankajam Thyagarajan, Vidur Sabarwal, Sandhya p. Koushika, Anindya Ghosh Roy.

let-7 miRNA controls CED-7 homotypic adhesion and EFF-1 mediated axonal self-fusion to restore touch sensation following injury.

Proceedings of National Academy of Science USA, 2017 (PNAS) (DOI)

- **Atrayee Basu**, Sibaram Behera, Smriti Bharadwaj, Shirshendu Dey, Anindya Ghosh Roy

Regulation of UNC-40/DCC and UNC-6/Netrin by DAF-16 promotes the functional rewiring of an injured axon.

Development, 2021 (Development) (DOI)

- Dharmendra Puri, Keerthana Poniah, Kasturi Biswas, **Atrayee Basu**, Swagata Dey, Erik Lindquist, Anindya Ghosh Roy.

WNT signaling establishes microtubule polarity in neuron through the regulation of Kinesin-13 family microtubule depolymerizing factor.

Journal of Cell Biology, 2021 (JCB) (DOI)

My Contribution: Live tracking of the presynaptic vesicular transport in the axons using Spinning Disc Confocal Microscopy.

- Sandeep Kumar, Sibaram Behera, **Atrayee Basu**, Shirshendu Dey, Anindya Ghosh Roy

Swimming exercise promotes post-injury axon regeneration and functional restoration through AMPK.

eNeuro, 2021 (eNeuro) (DOI)

My Contribution: Assaying regenerative responses of the mechanosensory neuron post axotomy and correlating the gentle touch behaviour.

- Sucheta S. Kulkarni, Vidur Sabharwal, Seema Sheoran, **Atrayee Basu**, Kunihiro Matsumoto, Naoki Hisamoto, Anindya Ghosh-Roy, Sandhya P. Koushika

UNC-16 alters DLK-1 localization and negatively regulates actin and microtubule dynamics in *C. elegans* regenerating neurons.

Genetics, 2021 (Genetics) (DOI)

My Contribution: Assaying regenerative responses of the mechanosensory neuron at different time-points post axotomy and correlating the gentle touch behaviour.

- PLATFORM PRESENTATIONS
- *Age related decline of functional restoration after neuronal injury*
Atrayee Basu, Shirshendu Dey, Anindya Ghosh Roy
“The 2nd Indian *C. elegans* Meeting” at National Institute of Immunology, New Delhi, India, 2018.
 - *Restoration of Functional Connectivity After Neuronal Injury*
Atrayee Basu, Shirshendu Dey, Anindya Ghosh Roy
”CeNeuro Meeting” in Nagoya, Aichi, Japan, 2016.
- POSTER PRESENTATIONS
- *Age-dependent regulation of functional restoration in touch neuron.*
Atrayee Basu, Shirshendu Dey, Anindya Ghosh Roy
“22nd International *C. elegans* conference” in UCLA, California, USA, 2019.
 - *Independent pathways prevent functional restoration after axonal injury in *Caenorhabditis elegans* adulthood.*
Atrayee Basu, Shirshendu Dey, Anindya Ghosh Roy
“Gordon Research Conference on Central Nervous System Injury and Repair” at Waterville Valley, in Waterville Valley, New Hampshire, USA, 2019.
 - *Age related decline of functional restoration after neuronal injury.*
Atrayee Basu, Shirshendu Dey, Anindya Ghosh Roy
“Young Scientist Symposium, Department of Biotechnology”, at IIT Chennai, 2017.
 - *Restoration of Functional Connectivity After Neuronal Injury using *C. elegans* mechanosensory neurons.*
Atrayee Basu, Shirshendu Dey, Anindya Ghosh Roy.
“International Meeting on Neuro Modulation of Behavior”, National Centre for Biological Sciences, India, November, 2014.
- AWARDS & ACHIEVEMENTS
- *Inspiring Science Award, 2019* for one of the best-published paper in Life Science in 2017-2018 from India.
Awarded by: TNQ (Transforming Content and Transforming Technology) India and Cell Press, 2019
 - *Travel Award for attending 22nd International *C. elegans* conference, UCLA, CA, USA, 2019*
Awarded by: SERB (Department of Science and Technology, Government of India Science & Engineering Research Board)

- *Financial Assistance for attending 22nd International C. elegans conference, UCLA, CA, USA, 2019*
Awarded by: Genetics Society of America (GSA).
- *Financial Assistance for attending Gordon Research Conference on Central Nervous System Injury and Repair, Waterville Valley, USA, 2019*
Awarded by: Gordon Research Conference and Wings of Life.
- *Travel Award for attending Ce Neuro Meeting in Aichi, Nagoya, Japan, 2016*
Awarded by: Company of Biologists.
- *Rank 2nd in BSc for Microbiology in II and III year (Hons).*
Awarded by: University of Calcutta.
- *Rank 2nd in BSc for Chemistry (Pass).*
Awarded by: Lady Brabourne college (University of Calcutta).
- *Award for getting above 90% in Secondary and above 80% in Higher Secondary Examinations.*
Awarded by: Bidya Bharati Girls' High School (West Bengal Council of Higher Secondary Education).

TECHNICAL EXPERTISE

- Mice handling, cortical and hippocampal neurons culture from day0-1 postnatal mice pups, Human iPSCs derived cortical neuron culture, CRISPR in human iPSCs, Regeneration assay in mouse and human iPSCs derived neuron culture, Western Blotting, Immuno Cytochemistry (ICC), Co-immunoprecipitation assay, Extensive imaging like Super resolution confocal imaging -STED microscopy, Epifluorescent, point scanning and spinning disc confocal, Multiphoton microscope), IR and UV laser based axotomy, molecular biology techniques like cloning, PCR, quantitative real time PCR, expertise in working with worm *C. elegans* husbandry, behavioral assay- gentle touch response, micro injection, genetics.

SOFTWARE EXPERTISE

- Graph Pad Prism, Image J, Prairie View, LSM, Zen Blue, Adobe Illustrator, Adobe Photoshop, Latex, coding in Python, LASX- Leica software for STED microscopy.

TEACHING EXPERIENCE

- *Teaching Assistant*, Neurobiology workshop in Regional Centre for Biotechnology, 2020
- *Teaching Assistant*, Microscopy course for the first year coursework in

National Brain Research Centre. 2017, 2018 and 2019

Dr. Anindya Ghosh Roy (NBRC).

- *Teaching Assistant*, IBRO School, in National Brain Research Centre. 2016

Dr. Kavita Babu (IISER Mohali) and Dr Anindya Ghosh Roy (NBRC).

- *Teaching Assistant*, Science Day Celebration in Lady Brabourne College 2011, 2012, 2013

LANGUAGE
PROFICIENCY

English, Bengali and Hindi

HOBBIES

Indian Classical dance (Bharatnatyam) (Professional Level), Music and Painting.

IN NEWS

- Way to repair damaged neurons discovered by scientists at NBRC in Gurugram ([The Hindu](#))
- Nerve regrows after injury in a soil-living worm ([Nature India](#))

REFEREES

Dr. Stephen M Strittmatter MD, PhD, AB

Vincent Coates Professor of Neurology and Professor of Neuroscience; Chair, Neuroscience; Director, Kavli Institute for Neuroscience; Director, Cellular Neuroscience, Neurodegeneration and Repair; Director, Memory Disorders Clinic; Director, Yale Alzheimer's Disease Research Center

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Dr. Anindya Ghosh Roy

Scientist-V and Additional Professor, National Brain Research Centre. Haryana

email id: anindya@nbrc.ac.in ; anindyagroy@gmail.com

Dr. Sourav Banerjee

Scientist-V and Additional Professor, National Brain Research Centre. Haryana

email id: sourav@nbrc.ac.in ; souravnbrc@gmail.com

Dr. Sandhya P Koushika

Associate Professor, Tata Institute of Fundamental Research. Mumbai

email id: spkoushika@tifr.res.in

