Achira Roy, MSc, PhD

DBT-Ramalingaswami Fellow
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Education

2013	**PhD, Department of Biological Sciences** Tata Institute of Fundamental Research, Mumbai, India Thesis Title: "*Lhx2 is necessary for patterning the forebrain midline*" Advisor: Dr. Shubha Tole
2007	**Master of Science (MSc), Biophysics and Molecular Biology** University College of Science & Technology, University of Calcutta, Kolkata, India **77.4%** (Ist class)
2005	**Bachelor of Science (BSc), Zoology (Honours), Chemistry, Physiology** Presidency College, University of Calcutta, Kolkata, India **71%** (Ist class); University Rank: **4th** (in Zoology Honours)

Research/Professional Experience

Sep 2021 – current	**Assistant Professor** (*DBT-Ramalingaswami Fellow*) Neuroscience Unit Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru, India
Sep 2013 – Aug 2021	**Postdoctoral Fellow** (Developmental and Translational Biomedical Neuroscience) Seattle Children's Research Institute (SCRI), Seattle, USA Advisor: Dr. Kathleen J. Millen
Nov 2007 – Jan 2013	**PhD Research Scholar** (Developmental Neuroscience) Tata Institute of Fundamental Research (TIFR), Mumbai, India Advisor: Dr. Shubha Tole
2006	**Postgraduate Summer Research Fellow** (Molecular Mycology) Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru, India under JNCASR Summer Research Fellowship Advisor: Dr. Kaustuv Sanyal
2003	**Undergraduate Summer Visiting-Student Fellow** (Anthropology and Human Genetics) Indian Statistical Institute (ISI), Kolkata, India under Indian Academy of Sciences (IAS) summer fellowship Advisor: Dr. Partha P. Majumder

Areas of Specialization & Research Interests

- Developmental neurobiology (with expertise in forebrain development); neurogenetics
- Translational biomedical research using mouse models of human neurodevelopmental disorders

Citizenship: India

ORCID: http://orcid.org/0000-0002-6274-0667

Awards, Honours and Fellowships

Jun 2022	**International Research Donation** towards studying rare neurodevelopmental disorders by the M-CM Network, New York, USA, in recognition of the work presented at the International Scientific Meeting for PIK3CA Related Conditions
2021 – 2026	**Ramalingaswami Re-entry Fellowship** Department of Biotechnology, Ministry of Science and Technology, India
Nov 2021	**Emerging Leaders Scholarship** CLOVES Syndrome Community of Chan Zuckerberg Initiative, to attend and present invited talk at the International Scientific Meeting for PIK3CA Related Conditions
2020	**Top 20 Winner of #StemCellfie Contest 2020** STEMCELL Technologies Inc., Canada
2017	**Professional Development Award** Seattle Children's Research Staff Development Committee, Seattle, USA
2016	**ISDN 2016 Travel Award** 21st Biennial Meeting of the International Society for Developmental Neuroscience (ISDN), Antibes-Juan les Pins, France
2014	**Best Poster Award** Joint Meeting of the 20th Biennial Meeting of the ISDN and the 5th Annual NeuroDevNet Brain Development Conference, Montreal, Canada
2012	**International Travel Support/Grant (DBT-CTEP)** for EMBO conference, Heidelberg Department of Biotechnology, Ministry of Science and Technology, India
2012	**Best Poster Award** 19th Biennial Meeting of the ISDN, Mumbai, India
2007 – 2012	**PhD Research Scholarship** Tata Institute of Fundamental Research, Mumbai, India
2007	**Junior Research Fellowship** in Life Sciences, under the Council of Scientific & Industrial Research (**CSIR-JRF**) fellowship scheme, India, *qualified*
2007	**Graduate Aptitude Test in Engineering (GATE)**, India, *qualified*
2006	**Summer Research Fellowship** Programme (**SRFP**), Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), India
2005	**University Rank certificate (4th in BSc, Zoology Honours)** University of Calcutta, Kolkata, India
2003	**Summer Visiting Student-fellowship**, Indian Academy of Sciences (IAS), India

Professional Affiliations

2008 – present	Member, Society for Neuroscience (SfN)
2010 – present	Life member, Indian Academy of Neurosciences (IAN)
2018 – present	Member, Society for Developmental Biology (SDB)

Funding

Ongoing:

1. **International Research Donation** to Neurodevelopment Lab, JNCASR, towards studying rare neurodevelopmental disorders **(USD 20,000)**
   Agency: M-CM Network, New York, USA
   Role: Principal Investigator
   Date: June 2022
   https://www.m-cm.net/blog/post/donation_to_the_neurodevelopment_lab_of_dr_achira_roy_at_jncasr

2. **Ramalingaswami Re-entry Fellowship** **(INR 1,13,90,000)**
   Title: Determining mechanisms of early ependymal development which when disrupted, contribute to hydrocephalus
   Agency: Department of Biotechnology, Ministry of Science & Technology, India
   Role: Principal Investigator
   Period: Sep 2021 – Sep 2026

Completed:

1. **Hydrocephalus Association 2018 Innovator Award** **(USD 50,000)**
   Title: Preclinical assessment of small molecule therapy for post-hemorrhagic hydrocephalus
   Agency: Hydrocephalus Association, USA
   Role: Co-investigator and Key personnel
   Period: Dec 2018 – Apr 2020

Publications (*: corresponding author(s); †: significant publication)

Total publications:	14 peer-reviewed publications (first-author articles: 8; co-corresponding author: 2); 2 non-reviewed publications
Total citations (2012-till date):	526
H-index:	11
i10 index:	12

Peer-reviewed Research Articles:

†2021 **Roy A***, Han VZ, Bard AM, Wehle DT, Smith SEP, Ramirez JM, Kalume F, Millen KJ*. Non-synaptic cell-autonomous mechanisms underlie neuronal hyperexcitability in a genetic model of PIK3CA-driven intractable epilepsy. ***Frontiers in Molecular Neuroscience***, 2021; 14:772847. PMID: 34899181, PMCID: PMC8662737. Citation: 2.

†2020 **Roy A**, Millen KJ, Kapur RP. Hippocampal granule cell dispersion: a non-specific finding in pediatric patients with no history of seizures. ***Acta Neuropathologica Communications.*** 2020; 8(1):54. PMID: 32317027, PMCID: PMC7171777. Citations: 17.

2020 **Roy A*,** Deng M, Aldinger KA, Glass IA, Millen KJ*. Laser capture micro-dissection (LCM) of neonatal mouse forebrain for RNA isolation. ***Bio-protocol.*** 2020; Jan 5;10(1): e3475. PMID: **32190713,** PMCID: PMC7079735.

2019 Chizhikov VV*, Iskusnykh IY, Steshina EY, Fattakhov N, Lindgren AG, Shetty AS, **Roy A**, Tole S, Millen KJ*. Early dorsomedial tissue interactions regulate gyrification of distal neocortex. ***Nature Communications.*** 2019; 10(1):5192. PMID: 31729356, PMCID: PMC6858446. Citations: 11.

†2019 **Roy A**, Murphy RM, Deng M, MacDonald JW, Bammler TK, Aldinger KA, Glass IA, Millen KJ. PI3K-Yap activity drives cortical gyrification and hydrocephalus in mice. ***eLife****.* 2019; May 16;8. pii: e45961. PMID: 31094678, PMCID: PMC6544437. Citations: 21.

2018 Godbole G, Shetty AS, **Roy A,** Chen B, Miyoshi G, Fishell G, Tole S. Hierarchical genetic interactions between FOXG1 and LHX2 regulate the formation of the cortical hem in the developing telencephalon. ***Development.*** 2018; 145(1): dev154583. PMID: 29229772; PMCID: PMC5825872. Citations: 32.

2017 Godbole G, **Roy A**, Shetty AS, Tole S. Novel functions of LHX2 and PAX6 in the developing telencephalon revealed upon combined loss of both genes. ***Neural Development.*** 2017; Nov 15;12(1):19. PMID: 29141678, PMCID: PMC5688701. Citations: 13.

2016 Di Donato N, Jean YY, Maga AM, Krewson BD, Shupp AB, Avrutsky MI, **Roy A,** Collins S, Olds C, Willert RA, *et al*…Jinks RN. Mutations in CRADD Result in Reduced Caspase-2-Mediated Neuronal Apoptosis and Cause Megalencephaly with a Rare Lissencephaly Variant. ***American journal of human genetics****.* 2016; 99(5):1117-1129. PMID: 27773430, PMCID: PMC5097945. Citations: 51.

†2015 **Roy A,** Skibo J, Kalume F, Ni J, Rankin S, Lu Y, Dobyns WB, Mills GB, Zhao JJ, Baker SJ, Millen KJ. Mouse models of human PIK3CA-related brain overgrowth have acutely treatable epilepsy. ***eLife****.* 2015; Dec 3;4. pii: e12703. PMID: 26633882, PMCID: PMC4744197. Citations: 77.

2014 **Roy A,** Gonzalez-Gomez M, Pierani A, Meyer G*****, Tole S*****. Lhx2 regulates the development of the forebrain hem system. ***Cerebral Cortex*** (New York, N.Y.:1991). 2014; 24(5):1361-72. PMID: 23307637, PMCID: PMCID: PMC3977624. Citations: 69.

†2013 **Roy A,** de Melo J, Chaturvedi D, Thein T, Cabrera-Socorro A, Houart C, Meyer G, Blackshaw S, Tole S. LHX2 is necessary for the maintenance of optic identity and for the progression of optic morphogenesis. ***The Journal of Neuroscience***: the official journal of the Society for Neuroscience. 2013; 33(16):6877-84. NIHMSID: NIHMS469004, PMID: 23595746, PMCID: PMC3664457. Citations: 83.

2013 Huilgol D, Udin S, Shimogori T, Saha B, **Roy A,** Aizawa S, Hevner RF, Meyer G, Ohshima T, Pleasure SJ, Zhao Y, Tole S. Dual origins of the mammalian accessory olfactory bulb revealed by an evolutionarily conserved migratory stream. ***Nature Neuroscience****.* 2013; 16(2):157-65. PMID: 23292680, doi: 10.1038/nn.3297. Citations: 45.

2012 Harel I, Maezawa Y, Avraham R, Rinon A, Ma HY, Cross JW, Leviatan N, Hegesh J, **Roy A,** Jacob-Hirsch J, Rechavi G, Carvajal J, Tole S, Kioussi C, Quaggin S, Tzahor E. Pharyngeal mesoderm regulatory network controls cardiac and head muscle morphogenesis. ***Proceedings of the National Academy of Sciences of the United States of America*****.** 2012; 109(46):18839-44. PMID: 23112163, PMCID: PMC3503185. Citations: 83.

Peer-reviewed Book chapter:

2018 Mirzaa G, **Roy A**, Dobyns WB, Millen KJ, Hevner RF. 'Hemimegalencephaly and Dysplastic Megalencephaly'. In *Developmental Neuropathology,* 2nd edition. Edited by Adle-Biassette H, Harding BN, Golden JA. Wiley Blackwell; March 2018. https://doi.org/10.1002/9781119013112.ch5. Citations: 19.

Other scientific publications (Preprint/Invited Report/Conference Paper):

2019 **Roy A**. New mechanism driving cortical gyrification and hydrocephalus found in mice suggests scope for novel therapy. *Science X*, December 12, 2019. [Invited report on Roy *et al.*, 2019, *eLife*: https://sciencex.com/news/2019-12-mechanism-cortical-gyrification-hydrocephalus-mice.html]

2015 **Roy A**, Ni J, Skibo J, Rankin S, Dobyns WB, Kalume F, Baker SJ, Zhao J, Millen KJ. Modeling human PIK3CA-related congenital brain overgrowth and epilepsy in mice. *International journal of developmental neuroscience*: the official journal of the International Society for Developmental Neuroscience. 2015; 47(Pt A):46. Citations: 2.

Manuscripts in preparation:

1. Vishal RL, Sharma A, Chowdhury S, **Roy A***. Early Onset Epilepsy – types, causes and perspectives *(Review)*
2. **Roy A** (as part of consortium). Spatial and cell type-related transcriptional landscape in fetal Down's syndrome patients reveal novel distinct features. *(Original Research Article)*
3. **Roy A***, Kapur R, Mirzaa GM, Dobyns WB, Millen KJ. *PIK3CA* activating mutations disrupt hippocampal development in humans. *(Original Research Article)*

Reviewer for International Journals *(journal headquarters in brackets)*:

- eLife *(UK)*
- Nature Communications *(UK)*
- Acta Neuropathologica Communications *(Netherlands, USA)*
- The Journal of Pathology *(UK, Ireland)*
- Bio-protocol *(USA)*
- Seizure: European Journal of Epilepsy – *The official journal of Epilepsy Action (UK)*
- Frontiers in Cell and Developmental Biology *(UK, Switzerland)*
- European Journal of Neuroscience – *The official journal of the Federation of European Neuroscience Societies (FENS) (UK)*
- International Journal of Molecular Sciences *(Switzerland)*

Teaching Experience

2023 – current	*Course instructor*, Graduate-level academic course on "Neurodevelopment and Disorders" (JNS-206), JNCASR, India
2022 – current	*Course co-instructor*, Neuroanatomy Course (JNS-201) practical classes, JNCASR, India
2007 – 2011	*Teaching assistant*, graduate-level practical course on "Embryonic mouse brain dissection", Teaching assistant, Tata Institute of Fundamental Research, Mumbai, India
2011	*Instructor*, Graduate-level academic course on "Techniques in Molecular Biology/ Research Tools (DBS 1006)", Tata Institute of Fundamental Research, Mumbai, India
2010 – 2013	*Volunteer Teacher*, Kendgora Adarsha Sikshayatan, Amlasole, West Bengal, India, teaching Biology, Mathematics and English to tribal children

Mentoring Experience

***As Principal Investigator (at JNCASR, India)*:**

- *Students pursuing PhD:* Vishal R Lolam (Int PhD 2020 batch), Aaheli Chakrabarty (PhD 2022 batch)
- *Visiting intern:* Aakanksha Dharmapuri, Vellore Institute of Technology *(under JNCASR Long-term Visiting Student Programme (LVSP), Jan 2023-current)*

- *Short-term trainees:* Shatabdi Choudhury (R&D Assistant, Jan-Jul 2022), NS Neeta (R&D Assistant, Aug 2022-current), Keerthana Ravishankar (summer intern 2022), Venkateswaran M (JNCASR SRFP 2022)
- *Students undergone lab rotations:* Aman Sharma, Vishal R Lolam (Int PhD 2020 batch)

***As Principal Investigator (outside JNCASR, India)*:**

- Serving as ***Thesis committee member*** at Vellore Institute of Technology (VIT)

Before joining JNCASR, I mentored the following trainees:
***As postdoc (at SCHRI, USA)*:**

- *Undergraduates*: *Rory M. Murphy **(2017-2020)**; Kevin Z. Zhu (**2016**); Taylor Faubion (**2014**)*

***As PhD scholar (at TIFR, India)*:**

- *Postgraduates: Veena Kinare (**2010-2011**); Riyad Seervai (**2010**); Akanksha Agarwal (**2008-2010**)*

Invited/Selected Talks

2022	MBGU-NSU Day Academic Talk, titled *"Brain Development and disorders – a beginning towards bridging gaps"*
2022	Sci-ROI@India Virtual Launch Event, Science Showcase session
2021	*In House* Symposium, Jawaharlal Nehru Center for Advanced Scientific Research (JNCASR), Bengaluru, India
2021	International Scientific Meeting for PIK3CA Related Conditions, USA
2020	4th Annual Postdoc and Student Research Symposium, Seattle Children's Research Institute, Seattle, USA
2020	International online conference "Class I PI3K: disease modelling and drug targeting"
2020	Young Investigator Meeting 2020, Mahabalipuram, India
2020	Tata Institute of Fundamental Research (TIFR), Mumbai, India
2019	Hydrocephalus Association Research Workshop, St. Louis, MO, USA
2019	Washington University School of Medicine, St. Louis, MO, USA
2017	Indian Institute of Science (IISc), Center for Neuroscience, Bengaluru, India
2017	Indian Institute of Technology (IIT) Kanpur, Kanpur, India
2017	Indian Institute of Science Education and Research (IISER) Pune, Pune, India
2017	National Centre for Cell Science, Pune, India
2017	National Brain Research Centre (NBRC), Gurgaon, India
2017	TIFR Center for Interdisciplinary Sciences, Hyderabad, India
2017	Centre for Cellular and Molecular Biology (CCMB), Hyderabad, India
2015	JNCASR, Bengaluru, India
2015	Neurodevelopmental Disorders Research Consortium, Seattle, USA
2014	"Brain development and congenital neurodevelopmental disorders" symposium, Seattle, USA
2013	University College of Science & Technology, Department of Biophysics, Molecular Biology and Bioinformatics, Kolkata, India
2012	King's College London, MRC Centre for Developmental Neurobiology, London, UK
2012	University College London (UCL) Institute of Child Health, London, UK
2007	National Symposium on Current Trends in Zoological Research, Kolkata, India

Poster presentations at International Conferences

2021	23rd Biennial Meeting of the International Society of Developmental Neuroscience (ISDN2021), *online*
2020	American Epilepsy Society (AES) Annual Meeting, *online*

2020	Young Investigator Meeting 2020, Mahabalipuram, India
2018	Society for Developmental Biology 77th Annual Meeting, Portland, OR, USA
2018	Keystone Symposia Conference, State of the Brain: Genetic Dissection of Brain Circuits and Behavior in Health and Disease, Keystone, USA
2017	Cortical Development Conference 2017, Chania, Greece
2016	21st Biennial Meeting of ISDN, Juan les Pins-Antibes, France
2015	Society for Neuroscience 45th Annual Meeting 2015, Chicago, USA
2014	Joint Meeting of the 20th Biennial Meeting of the ISDN and the 5th Annual NeuroDevNet Brain Development Conference, Montreal, Canada
2012	Society for Neuroscience 42nd Annual Meeting 2012, New Orleans, USA
2012	EMBO Conference Series Morphogenesis and Dynamics of Multicellular Systems, EMBL Heidelberg, Germany
2012	19th Biennial Meeting of the ISDN, Mumbai, India

Conferences/Workshops attended

2020	Science and Research Opportunities in India (Sci-ROI) 5th Annual Event, *online*
2020	Society for Developmental Biology 79th Annual Meeting, USA, *online*
2020	The Monsoon Brain Meeting, India, *online*
2019	Society for Neuroscience 49th Annual Meeting 2019, Chicago, USA
2019	24th Summer Institute in Statistical Genetics: “Introduction To R”, University of Washington, USA
2015	National Institutes of Health Professional Grant Development Workshop, Seattle, USA
2009	The Fourth Bangalore Benny Shilo Course in Developmental Biology, Bangalore, India
2008	“Model Organisms and Stem Cells in Development, Regeneration and Disease” International Symposium, Bangalore, India
2008	SERC School in Neurosciences, Nagpur, India
2007	International Conference on “Chromosomes to Neurons”, Kolkata, India
2006	National Seminar on Transgenic Plants: Prometheus Unbound, Kolkata, India
2006	Annual Meeting of the Indian Biophysical Society, Kolkata, India

Other academic activities

2022	Organized *“Brain Development and disorders”* demonstration table for high-school students at JNCASR on National Science Day, India
2022	Participated and interacted with the JNCASR team on GATI (Gender Advancement for Transforming Institutions) Pilot Project, initiated by the Department of Science & Technology (DST).
2013	Contributed original illustrations to book chapter “Telencephalon Patterning” by Tole S. and Hebert J. in “*Cellular Migration and Formation of Neuronal Connections: Comprehensive Developmental Neuroscience*” (2013), John Rubenstein and Pasko Rakic (Eds). Academic Press. ISBN: 978-0-12-397265-1
2010	Co-organizer, “International Speaker Seminar” series at TIFR, India under guidance of Prof. Veronica Rodrigues
2009 – 2011	Organizer and moderator, Departmental journal club at TIFR, India