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ACADEMIC AND RESEARCH EXPERIENCE

12 September 2015 – 31 July 2019: Postdoctoral Researcher (3 years 10 months)

Department of Pharmacology
University of California Davis; USA

Research supervisor: **Prof. Dr. Manuel Navedo**
Prof. Dr. Johannes W. Hell

Project 1- *Trafficking of L-type Ca²⁺ channels*

Project 2- *L-type Ca²⁺ channel functions in diabetes*

Project 3- *Intracellular transport and localization of AMPA receptors*

10 March 2015 - 10 September 2015: Postdoctoral Researcher (6 months)

Laboratory of Ion Channel Research
Department of Cellular and Molecular Medicine; *KU Leuven; Belgium.*

Research supervisor: **Prof. Dr. Thomas Voets**

Project - *Trafficking of ion channels*

15 Oct 2009 - 10 March 2015: PhD in Biomedical Science,

Laboratory of Ion Channel Research
Department of Cellular and Molecular Medicine; *KU Leuven; Belgium.*

Research supervisor: **Prof. Dr. Thomas Voets**

Research co-supervisor: **Prof. Dr. Joris Vriens**

PhD Thesis - *Trafficking of TRP channels.*

Oct 2007 - April 2009: Project Assistant.

Department of Molecular and Cellular Neuroscience
National Brain Research Centre, Haryana, India.

Research supervisor: **Prof. Dr. Anirban Basu**

Project 1- *Role of environmental carcinogens in the induction of microglial activation and subsequent neuronal damage.*

Project 2- *Pathophysiology of Japanese encephalitis virus.*

2005 - 2007: Master of Science in Physiology

Specialization-Immunology and Microbiology
University of Calcutta, Kolkata, India

First Rank in Department of Physiology (Gold Medalist)

M.Sc. Dissertation thesis- *Effect of soluble antigen administration on the steroidogenic activity in Murine Lymphoid and non-Lymphoid Tissue.*

Research supervisor: **Prof. Dr. Biswadev Bishayi**

2002 - 2005 : Bachelor of Science (Honors) in Physiology

City College Calcutta, affiliated to *University of Calcutta, Kolkata, India*
First Rank in the college department

TEACHING EXPERIENCE

Worked as a teaching assistant to 1st and 2nd-year pharmacy, medicine, biomedical science and dentistry students at KU Leuven, during my PhD tenure.

During my postdoc, I taught and mentored undergraduate and rotation students.

EXPERIMENTAL SKILLS & EXPERIENCE

Total Internal Reflection Microscopy This high-end technique formed the backbone technique for my daily PhD and postdoc work and for other collaborative projects in which I participated. The systems were equipped with α Plan-Apochromat 100x/1.46 or 1.49 Oil DIC objective. It was further equipped with patch-clamp and home-built rapid perfusion system.

Spinning Disk microscopy Used this technique extensively during my postdoc for time-lapse volume recording of cell lines and primary cells (4D recording). Such an experiment gave a detailed picture of the intracellular trafficking dynamics of the protein of interest.

Multiphoton and Confocal Complete knowledge of the principle and handling of the microscopes.

FLuo-4, Cal-590 and Fura-2-based calcium imaging During my PhD and postdoc, I frequently performed microfluorimetric calcium imaging for functional studies of TRPM8 and Ca_v1.2 in cell lines, primary sensory neurons, and primary smooth muscle cells.

FRET imaging and analysis During my postdoc I conducted numerous FRET experiments and analyzed data

Electrophysiology I used the whole-cell patch-clamp technique for functional studies on TRP and Ca_v1.2 channels, both for my PhD and postdoc work and for other collaborative projects in which I participated.

Cell culture techniques Culture and maintenance of cell lines (Neuro2A, BV2, HEK293T, CHO); Isolation, culture and maintenance of primary cells (arterial smooth muscles, neurons, Neurosphere, Primary Microglia and Primary Astrocytes); Transfection with lipofection and electroporation techniques, both with cell lines and primary cells.

In vivo experiments with mice During my PhD work I did behavioral studies to investigate thermosensory physiology of wild type and mutant mice. During my postdoc, I actively participated in the creation of streptozotocin (STZ)-induced diabetic mouse model. Other technical skills from my pre-doctoral research period include toxicity studies, survival study, tissue isolation, Virus propagation.

Ex vivo diameter measurement of artery During my postdoc I performed measurement of pressurized cerebral and mesenteric arteries to assess myogenic tone response in physiological, pathophysiological conditions and under the challenge of different drugs/stimulus.

Biochemistry Plasmid amplification with Maxi-prep, Western blot, Agarose Gel Electrophoresis, Proximity ligation assay, PCR, *In situ* hybridization, Flow cytometry, Immunocytochemistry, Immunohistochemistry, (including immunohistochemistry in whole mount and slide sections) and various biochemical assays (MTT, MTS, LDH assay and NO measurement, ROS measurement, Membrane fluidity measurement, TUNEL staining e.t.c)

MANUSCRIPT AND GRANT WRITING SKILLS

I wrote all of my first author papers (reviews, articles and book chapter) myself under the excellent supervision of my mentors. Further I wrote and secured American Heart Association postdoctoral fellowship, on basis of my own original ideas.

SELECTED CONFERENCE PRESENTATIONS

Presented a poster on “RNA interference” at *International Conference on Frontier Researches in Integrated Physiology*, University of Calcutta, India, December 2006.

Presented a poster on “Tobacco carcinogen induces microglial activation and subsequent neuronal damage” *International conference on advances in neuroscience and XXVI Annual Meeting of Indian Academy of Neurosciences*, India, January 2009.

Presented a poster on “Characterization of the trafficking of human transient receptor potential melastatin 8 (hTRPM8) channel by total internal reflection fluorescence (TIRF) microscopy” *Belgian Society of Fundamental and Clinical Physiology and Pharmacology*, Brussels, March 2011

Oral presentation on “Characterization of the trafficking of human transient receptor potential melastatin 8 (hTRPM8) channel by total internal reflection fluorescence (TIRF) microscopy” *International Workshop on Transient Receptor Potential Channels*, Valencia, Spain, September 2012

Oral presentation on “Role of LAMP1 and VAMP7 containing intracellular compartments in the trafficking of TRPM8 channels” *Physicon 2013 - XXV Annual National Conference of Physiological Society of India*, India, December 2013

Presented a poster on “Molecular Determinants of the Trafficking of the Cold-activated Transient Receptor Potential Ion Channel TRPM8” *Experimental Biology Meeting*, Boston April 2015.

Presented a poster on “Intracellular and Near-Membrane Dynamics of L-type $Ca_v1.2$ Channel” *Experimental Biology Meeting*, Chicago April 2017.

Presented a poster on “Dynamic L-type $Ca_v1.2$ channel trafficking facilitates $Ca_v1.2$ clustering and cooperative gating” *Experimental Biology Meeting*, San Diego April 2018.

AWARDS AND RECOGNITION

[Awarded American Heart Association Postdoctoral Fellowship 2018](#)

Awarded Vidyasagar University Young Scientist Award – 2013 for best oral presentation of original research during *Physicon 2013 - XXV Annual National Conference of Physiological Society of India*, India, December 2013

Recipient of the gold medal from the University of Calcutta for Ranking First from the Department of Physiology in Master of Science

PRESS RELEASES

- 1) http://www.eurekalert.org/pub_releases/2009-06/w-nrd062309.php
- 2) <https://health.ucdavis.edu/publish/news/newsroom/13999>

Publication List

Early Career (as project assistant at NBRC, India)

- 1) Dutta K*, **Ghosh D***, Nazmi A, Kumawat KL, Basu A. A common carcinogen benzo[a]pyrene causes neuronal death in mouse via microglial activation. PLoSOne. 2010 Apr 1;5(4):e9984. doi: 10.1371/journal.pone.0009984. (* co first author)
- 2) Das S, **Ghosh D**, Basu A. Japanese encephalitis virus induce immuno-competency in neural stem/progenitor cells. PLoS One. 2009 Dec 2;4(12):e8134. doi:10.1371/journal.pone.0008134. PubMed PMID: 19956550. (*Impact Factor : 2.7*)
- 3) **Ghosh D**, Basu A. Japanese encephalitis-a pathological and clinical perspective. PLoS Negl Trop Dis. 2009 Sep 29;3(9):e437. doi:10.1371/journal.pntd.0000437. PubMed PMID: 19787040. (*review article*) (*Impact Factor : 4.48*)
- 4) **Ghosh D**, Mishra MK, Das S, Kaushik DK, Basu A. Tobacco carcinogen induces microglial activation and subsequent neuronal damage. J Neurochem. 2009 Aug;110(3):1070-81. doi: 10.1111/j.1471-4159.2009.06203.x. Epub 2009 Jun 2. (*Impact Factor :4.87*)
- 5) Dutta K, **Ghosh D**, Basu A. Curcumin protects neuronal cells from Japanese encephalitis virus-mediated cell death and also inhibits infective viral particle formation by dysregulation of ubiquitin-proteasome system. J Neuroimmune Pharmacol. 2009 Sep;4(3):328-37. doi: 10.1007/s11481-009-9158-2. (*Impact Factor :4.87*)
- 6) Mishra MK, **Ghosh D**, Duseja R, Basu A. Antioxidant potential of Minocycline in Japanese Encephalitis Virus infection in murine neuroblastoma cells: correlation with membrane fluidity and cell death. Neurochem Int. 2009 Jun;54(7):464-70. doi: 10.1016/j.neuint.2009.01.022. Epub 2009 Feb 11. PubMed PMID: 19428790.
- 7) **Ghosh D**, Basu A. Present perspectives on flaviviral chemotherapy. Drug Discov Today. 2008 Jul;13(13-14):619-24. doi: 10.1016/j.drudis.2008.04.001 (*review article*). (*Impact Factor : 7.321*)

Graduate Career (PhD) (at KU Leuven, Belgium)

- 8) Startek JB, Boonen B, López-Requena A, Talavera A, Alpizar YA, **Ghosh D**, Van Ranst N, Nilius B, Voets T, Talavera K. Mouse TRPA1 function and membrane localization are modulated by direct interactions with cholesterol. Elife. 2019 Jun 11;8. doi: 10.7554/eLife.46084. PMID: 31184584 (*Impact Factor : 7.56*)
- 9) Janssens A, Gees M, Toth BI, **Ghosh D**, Mulier M, Vennekens R, Vriens J, Talavera K, Voets T. Definition of two agonist types at the mammalian cold-activated channel TRPM8. Elife. 2016 Jul 23;5. pii: e17240. doi:10.7554/eLife.17240. (*Impact Factor : 7.56*)
- 10) **Ghosh D**, Voets T. A TRiP to the plasma membrane. Temperature (Austin). 2015 May 11;2(2):163-5. doi: 10.1080/23328940.2015.1043483. (commentary)
- 11) **Ghosh D**, Voets T. Journey of a cold sensor - VAMP7-dependent transport of TRPM8. Channels (Austin). 2016 Sep 2;10(5):336-338. (commentary)

- 12) **Ghosh D**, Pinto S, Danglot L, Vandewauw I, Segal A, Van Ranst N, Benoit M, Janssens A, Vennekens R, Vanden Berghe P, Galli T, Vriens J, Voets T. VAMP7 regulates constitutive membrane incorporation of the cold-activated channel TRPM8. Nat Commun. 2016 Feb 4;7:10489. doi: 10.1038/ncomms10489. (*Impact Factor :11.87*)
- 13) Quaegebeur A, Segura I, Schmieder R, Verdegem D, Decimo I, Bifari F, Dresselaers T, Eelen G, **Ghosh D**, Davidson SM, Schoors S,...//...Voets T, Lemmens R, Bennett CF, Robberecht W, De Bock K, Dewerchin M, Ghesquière B, Fendt SM, Carmeliet P. Deletion or Inhibition of the Oxygen Sensor PHD1 Protects against Ischemic Stroke via Reprogramming of Neuronal Metabolism.Cell Metab. 2016 Feb 9; 23(2): 280-91. doi: 10.1016/j.cmet.2015.12.007.PMID: 26774962 (*Impact Factor : 22.415*)
- 14) Tóth BI, Konrad M, **Ghosh D**, Mohr F, Halaszovich CR, Leitner MG, Vriens J, Oberwinkler J, Voets T. Regulation of the transient receptor potential channel TRPM3 by phosphoinositides. J Gen Physiol. 2015 Jul;146(1):51-63. doi: 10.1085/jgp.201411339. PubMed PMID: 26123194. (*Impact Factor : 4.25*)
- 15) Mrkonjić S, Garcia-Elias A, Pardo-Pastor C, Bazellières E, Trepast X, Vriens J, **Ghosh D**, Voets T, Vicente R, Valverde MA. TRPV4 participates in the establishment of trailing adhesions and directional persistence of migrating cells. Pflugers Arch. 2015 Oct;467(10):2107-19. doi: 10.1007/s00424-014-1679-8. (*Impact Factor : 3.15*)
- 16) **Ghosh D**, Segal A, Voets T. Distinct modes of perimembrane TRP channel turnover revealed by TIR-FRAP. Sci Rep. 2014 Nov 19;4:7111. doi: 10.1038/srep07111. (*Impact Factor : 4.01*)
- 17) Sodero AO, Vriens J, **Ghosh D**, Stegner D, Brachet A, Pallotto M, Sassoè-Pognetto M, Brouwers JF, Helms JB, Nieswandt B, Voets T, Dotti CG. Cholesterol loss during glutamate-mediated excitotoxicity. EMBO J. 2012 Apr 4;31(7):1764-73. doi: 10.1038/emboj.2012.31. Epub 2012 Feb 17. (*Impact Factor : 11.22*)
- 18) Everaerts W, Zhen X, **Ghosh D**, Vriens J, Gevaert T, Gilbert JP, Hayward NJ, McNamara CR, Xue F, Moran MM, Strassmaier T, Uykai E, Owsianik G, Vennekens R, De Ridder D, Nilius B, Fanger CM, Voets T. Inhibition of the cation channel TRPV4 improves bladder function in mice and rats with cyclophosphamide-induced cystitis. Proc Natl Acad Sci U S A. 2010 Nov 2;107(44):19084-9. doi: 10.1073/pnas.1005333107. Epub 2010 Oct 18. PubMed PMID: 20956320; (*Impact Factor : 9.58*)

Postdoctoral Career (at University of California, Davis, USA)

- 19) Syed AU*, Reddy GR*, **Ghosh D***, Prada MP, Nystoriak MA, Morotti S, Grandi E, Sirish P, Chiamvimonvat N, Hell JW, Santana LF, Xiang YK, Nieves-Cintrón M, Navedo MF. Adenylyl cyclase 5-generated cAMP controls cerebral vascular reactivity during diabetic hyperglycemia. J Clin Invest. 2019 Jun 4;129(8):3140-3152. doi: 10.1172/JCI124705. PMID: 31162142 (* co-first author) (*Impact Factor :12.28*)
- 20) Smith FD, Omar MH, Nygren PJ, Soughayer J, Hoshi N, Lau HT, Snyder CG, Branon TC, **Ghosh D**, Langeberg LK, Ting AY, Santana LF, Ong SE, Navedo MF, Scott JD. Single nucleotide polymorphisms alter kinase anchoring and the subcellular targeting of A-kinase anchoring proteins. Proc Natl Acad Sci U S A. 2018 Dec 4;115(49):E11465-E11474. doi: 10.1073/pnas.1816614115. Epub 2018 Nov 19. PMID: 30455320 (*Impact Factor :9.58*)

- 21) Prada MP, Syed AU, Buonarati OR, Reddy GR, Nystoriak MA, **Ghosh D**, Simó S, Sato D, Sasse KC, Ward SM, Santana LF, Xiang YK, Hell JW, Nieves-Cintrón M, Navedo MF. A G_s -coupled purinergic receptor boosts Ca_{2+} influx and vascular contractility during diabetic hyperglycemia. *Elife*. 2019 Mar 1;8. pii: e42214. doi: 10.7554/eLife.42214. PMID: 30821687 (*Impact Factor : 7.56*)
- 22) Ito DW, Hannigan KI, **Ghosh D**, Xu B, Del Villar SG, Xiang YK, Dickson EJ, Navedo MF, Dixon RE. β -adrenergic-mediated dynamic augmentation of sarcolemmal Ca_v 1.2 clustering and co-operativity in ventricular myocytes. *J Physiol*. 2019 Apr;597(8):2139-2162. doi: 10.1113/JP277283. Epub 2019 Mar 12. PMID: 30714156 (*Impact Factor : 4.54*)
- 23) **Ghosh D**, Nieves-Cintrón M, Tajada S, Brust-Mascher I, Horne MC, Hell JW, Dixon RE, Santana LF, Navedo MF. Dynamic L-type Ca_v 1.2 channel trafficking facilitates Ca_v 1.2 clustering and cooperative gating. *Biochim Biophys Acta Mol Cell Res*. 2018 Sep;1865(9):1341-1355. doi: 10.1016/j.bbamcr.2018.06.013. PMID: 29959960 (*Impact Factor : 4.1*)
- 24) Nieves-Cintrón M, Syed AU, Buonarati O, Rigor R, Nystoriak MA, **Ghosh D**, Sasse K, Ward S, Santana LF, Hell J, and Navedo MF. Impaired BK_{Ca} channel function in native vascular smooth muscle from humans with type 2 diabetes. *Scientific Reports* doi:10.1038/s41598-017-14565-9. (*Impact Factor : 4.01*)
- 25) **Ghosh D**, Syed AU, Prada MP, Nystoriak MA, Santana LF, Nieves-Cintrón M, Navedo MF. Calcium Channels in Vascular Smooth Muscle. *Adv Pharmacol*. 2017;78:49-87. doi: 10.1016/bs.apha.2016.08.002. Epub 2016 Oct 14. PMID: 28212803 (*book chapter*).

Upcoming first author publications from postdoctoral works

- 1) Angiotensin induces rapid turnover of Ca_v 1.2 containing vesicles in vascular smooth muscle. (full research article under preparation) under supervision of Prof. Manuel Navedo.
- 2) Live-cell investigation of constitutive and stimulus-induced AMPA receptor trafficking and insertion in hippocampal neurons. (full research article under preparation) under supervision of Prof. Johannes Hell & Prof. Manuel Navedo.

Google Scholar Metrics

Total citation : 1171

h-index. : 14

i10-index. : 21