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A. Personal Statement

The major focus of our research group is to understand the fundamental mechanisms that govern neuronal positioning and connectivity during nervous system development, and how these processes are altered in disease. Precise movement of growing axons through complex extracellular environments is essential for the formation of functional neural circuits, and its disruption leads to neurodevelopmental and neurodegenerative disorders. In addition to developmental mechanisms, our lab is interested in how neuronal surface dynamics and neuron-glia interactions influence circuit integrity under inflammatory conditions. The key questions our lab seeks to address are: (i) how neurons navigate complex extracellular environments with high spatial precision, (ii) how the neuronal cell surface proteome is dynamically regulated to direct axon guidance decisions, (iii) how neuron-microglia surface proteome interactions govern synaptic remodeling and phagocytosis during development and neuroinflammation, and (iv) how ubiquitin adaptor proteins, classically studied in development, are repurposed to regulate neuroinflammatory signaling and neurodegeneration. We address these questions using an integrative approach combining biochemistry, advanced imaging, and genetic manipulation in mouse models and human iPSC-derived 2D neuronal cultures and 3D organoid systems.

B. Professional Experience

2026 (From February 2026)	Assistant Professor, Dept. of Animal Biology, SLS, UOH, India
2025 (June to November)	Visiting Faculty Fellow, MDC, Germany
2023 (March to January 2026)	DST-INSPIRE Faculty Fellow, NIAB Hyderabad, India
2020-2023 (December to February)	DST-INSPIRE Faculty Fellow, JNTU Hyderabad, India
2015-2020 (September to August)	Postdoctoral Research Fellow, University of Pennsylvania, USA
2010-2015 (July to August)	Graduate Researcher, University of Hyderabad, India

C. Awards and Honors

2020-2025	DST-INSPIRE Faculty Award/Grant.
2018	Best Poster Presentation Award, CSHL Axon guidance Meet, New York, USA.
2012	Gold Medal in Master's program, SV University, Tirupati, India
2012	Best Poster Presentation Award in RNA Meet, IISC, Bangalore, India
2011-2014	Senior Research Fellowship, CSIR-India
2009-2011	Junior Research Fellowship, CSIR-India
2009	Qualified GATE
2009	SVUCET (1st, 2nd &5th ranks in Microbiology, Biotechnology & Biochemistry)

D. Selected Conference presentations and Invited/Expert talks

- Gorla M (2024): Delivered a talk on "Stem cell therapeutics for neurological diseases" at the Stem Cell Workshop conducted at NIAB Hyderabad, India.
- Gorla M (2023): Delivered an Expert talk on "Molecular Biology tools and techniques" at a High-end workshop(Karyashala) at the Central University of Haryana, India.
- Gorla M (2022): Delivered a virtual talk on "Basic Animal Cell Culture Techniques" at the Central University ofHaryana, India.
- Gorla M (2022): Delivered a talk on "Animal Cell Line Technology" at the TSCOST-FDP programme at the Institute of Science and Technology,JNTUH, India.
- Gorla M (2020): A conserved E3 Ubiquitin ligase pathway targets Robo receptors for degradation to allow

commissural axons to cross the midline. Cold Spring Harbor Laboratory (CSHL), New York, USA.

- Gorla M (2018): Ndfip proteins negativelyregulate mammalian Robo receptors and control midline guidance in the spinal cord. Cold Spring Harbor Laboratory (CSHL), New York, USA.
- Gorla M (2019): Presented at the Biomedical Postdoctoral Programme at Smilow Research Centre, Pennsylvania, Philadelphia, USA.
- Gorla M (2016): Presenilin negatively regulates Robo repulsive signaling in the Drosophila nerve cord. Cold Spring Harbor Laboratory (CSHL), New York, USA.
- Gorla M (2013): Poster presented in 82nd Annual meeting of Society of Biological Chemists India (SBCI). Hyderabad, India.
- Gorla M (2012): A role of tRNA import in mitochondrial biogenesis. Indo-German Symposium on Research Dialogues in the Life Sciences. University of Hyderabad, Hyderabad, India.
- 2010: Participated in All India Cell Biology Conference. University of Hyderabad, Hyderabad, India.
- 2007: Participated in Society of Biological Chemists India (SBCI). SV University, Tirupati, India.

E. Mentoring

Karina Chaudhari, Cell and Molecular Biology rotation student @University of Pennsylvania, 2016.
Maya Hale, BGS Summer Undergraduate Researcher @University of Pennsylvania, 2016
Maya Hale, DSRB rotation student @University of Pennsylvania, 2018.
Alejandro Bohorquez, Undergraduate student @University of Pennsylvania, 2018.
Fabian Mantilla, BGS Summer Undergraduate Researcher @University of Pennsylvania, 2019.
Sai Pavan, Master's student, Thesis @JNTU Hyderabad, 2021.
Peddaka Ajay Reddy, Project Associate II (SERB project) @JNTU Hyderabad, 2022.
Sambit Kumar Pradhan, IAS fellow @NIAB Hyderabad, 2023 (Co-mentor).
Aparna Upadrsta, Project Assistant @ NIAB Hyderabad, 2024.
Ananya Aeri, PhD student @NIAB Hyderabad 2023-present (Co-Mentor)
Digvijay Singh Guleria, Project Assistant@NIAB Hyderabad, July 2024- present
Mentored many Master's students during my PhD (2010-2015).

F. Contribution to Science

As a graduate student, we uncovered the non-canonical functions of tRNA and stress-induced tiRNAs in regulating the apoptotic pathway. In addition, we have identified cytosolic factors that mediate the import of cytosolic tRNAs to mitochondria to maintain mitochondrial biogenesis in yeast and in mammalian cells.

1. **Gorla M**, Sepuri NB. (2014) Perturbation of apoptosis upon binding of tRNA to the heme domain of cytochrome c. ***Apoptosis* 19, 259–268.**
2. M. Saikia, R. Jobava, M. Parisien, A. Putnam, D. Krokowski, X.H. Gao, B.J. Guan, Y. Yuan, E. Jankowsky, Z. Feng, G.F. Hu, M. Pusztai-Carey, **M. Gorla,** N.B. Sepuri, T. Pan, M. Hatzoglou. (2014) Angiogenin-CleavedtRNA Halves Interact with Cytochrome c, Protecting Cells from Apoptosis during Osmotic Stress. ***Molecular and Cellular Biology 34, 2450–2463.***
3. Sepuri N. B, **Gorla M**, King M. P. (2012) Mitochondrial lysyl-tRNA synthetase independent import of tRNAlysine into yeast mitochondria. ***PLoS One*** 7, e35321 doi: 10.1371/journal.pone.0035321.

As a postdoctoral fellow, I investigated the molecular mechanisms of axon guidance in developing mouse spinal cord and in the *Drosophila* embryonic nerve cord. We have identified the role of Nedd-4 interacting proteins in down-regulating the expression of the repulsive Roundabout (Robo) receptor on the surface of commissural (crossing) axons in vitro and in vivo. This negative regulation of Robo surface expression on commissural axons is necessary for proper midline crossing and for axons to reach their ultimate synaptic targets on the opposite side of the body. We have also shown the conserved role of the WIRS domain of the Robo receptor in axon repulsion during development. In addition, I have also contributed as a co-author where we have shown the role of BAR domain-containing sorting nexin (SNX proteins) in promoting the normal growth of axons across the midline in the drosophila embryonic nerve cord.

1. **Gorla, M**., Santiago, C., Chaudhari K, Layman, AAK., Oliver, PM., and Bashaw, G.J. (2019) Functional

conservation of axon guidance receptor sorting: Ndfip proteins negatively regulate mammalian Robo receptorsand control midline guidance in the spinal cord. ***Cell Reports 2019*** Mar 19;26(12):3298-3312.e4.

2. **Gorla M**, Chaudhari K, Hale M, Potter C, Bashaw GJ. A Nedd4 E3 Ubiquitin ligase pathway inhibits Robo1 repulsion and promotes commissural axon guidance across the midline. ***Journal of Neuroscience. 2022*** Aug 22;42(40):7547–61. doi: 10.1523/JNEUROSCI.2491-21.2022***.*** PMID: 36002265
3. Simonetti B§, Paul B§, Chaudhari K, Weeratunga S, Steinberg F, **Gorla M**, Heesom KJ, Bashaw GJ, Collins BM, Cullen PJ (2019) Molecular identification of a BAR domain-containing coat complex for endosomal recycling of transmembrane proteins. ***Nature Cell Biology, 2019.*** 21(10): p. 1219-1233.
4. Chaudhari K, **Gorla M**, Chang C, Kania A and Bashaw GJ. Robo recruitment of the WAVE regulatory complex plays an essential and conserved role in midline repulsion. ***eLife 2021***;10:e64474

G. Complete list of Publications

1. **Gorla M*** and Guleria DS (2025) Rho GTPase signaling: A Molecular Switchboard for regulating the Actin Cytoskeleton in Axon Guidance. ***Journal of Cellular Physiology,*** *240, e70005* **DOI:** https://doi.org/10.1002/jcp.70005 (* **Corresponding Author)**

2. Aeri, A., **Gorla, M**. & Sharma, G.T. Veterinary Regenerative Medicine: The Evolving Role of Stem Cell-Based Therapies. ***Stem Cell Reviews and Reports*** **21**, 2484–2510 (2025). https://doi.org/10.1007/s12015-025-10963-z

3. Sabui A, Biswas M, Somvanshi PR, Kandagiri P, **Gorla M**, Mohammed F, Tammineni P. Decreased anterograde transport coupled with sustained retrograde transport contributes to reduced axonal mitochondrial density in tauopathy neurons. ***Frontiers in Molecular Neuroscience 2022*** Sep 30;15:927195. doi: 10.3389/fnmol.2022.927195.

4. **Gorla M**, Chaudhari K, Hale M, Potter C, Bashaw GJ. A Nedd4 E3 Ubiquitin ligase pathway inhibits Robo1 repulsion and promotes commissural axon guidance across the midline. ***Journal of Neuroscience. 2022*** Aug 22;42(40):7547–61. doi: 10.1523/JNEUROSCI.2491-21.2022***.*** PMID: 36002265

5. Chaudhari K, **Gorla M**, Chang C, Kania A and Bashaw GJ. Robo recruitment of the WAVE regulatorycomplex plays an essential and conserved role in midline repulsion. ***eLife 2021***;10:e64474 10.7554/eLife.64474.

6. **Gorla M,** Bashaw GJ. Molecular mechanisms regulating axon responsiveness at the midline. ***Developmental Biology 2020*** Oct 1;466(1-2):12-21. doi: 10.1016/j.ydbio.2020.08.006. Epub 2020 Aug 17. PMID: 32818516; PMCID:PMC8447865.

7. Mohammed F, **Gorla M,** Tammineni P, Sepuri NB. Reactive Oxygen Species generated by complex I inhibition signals the recruitment of STAT3 to mitochondria. ***FEBS letters 2020*** Jan 25. doi: 10.1002/1873-3468.13741

8. **Gorla, M**., Santiago, C., Chaudhari K, Layman, AAK., Oliver, PM., and Bashaw, G.J. (2019) Functional conservation of axon guidance receptor sorting: Ndfip proteins negatively regulate mammalian Robo receptors and control midline guidance in the spinal cord. ***Cell Reports 2019*** Mar 19;26(12):3298-3312.e4.

9. Simonetti B§, Paul B§, Chaudhari K, Weeratunga S, Steinberg F, **Gorla M**, Heesom KJ, Bashaw GJ, Collins BM, Cullen PJ (2019) Molecular identification of a BAR domain-containing coat complex for endosomal recycling of transmembrane proteins. ***Nature Cell Biology, 2019.*** 21(10): p. 1219-1233.

10. Gorla M, Sepuri NB. (2014) Perturbation of apoptosis upon binding of tRNA to the heme domain of cytochrome c. ***Apoptosis*** **19, 259–268.**

11. Murari A, Thiriveedi VR, Mohammad F, Vengaldas V**, Gorla M**, Tammineni P, Krishnamoorthy T, Sepuri NB(2015) Human mitochondrial MIA40 (CHCHD4) is a component of the Fe-S cluster export machinery. ***Biochem J 15, 471, 231-24.***

12. M. Saikia, R. Jobava, M. Parisien, A. Putnam, D. Krokowski, X.H. Gao, B.J. Guan, Y. Yuan, E. Jankowsky, Z. Feng, G.F. Hu, M. Pusztai-Carey, **M. Gorla,** N.B. Sepuri, T. Pan, M. Hatzoglou. (2014) Angiogenin-Cleaved

tRNA Halves Interact with Cytochrome c, Protecting Cells from Apoptosis during Osmotic Stress. ***Molecular and Cellular Biology 34, 2450–2463.***

13. Sepuri N. B, **Gorla M**, King M. P. (2012) Mitochondrial lysyl-tRNA synthetase independent import of tRNA lysine into yeast mitochondria. ***PLoS One*** 7, e35321 doi: 10.1371/journal.pone.0035321.

Book Chapters

1. Mankuzhy DP, Aeri A, **Gorla M**, Chandra V, Thirupathi Y, GT Sharma* (2023) Translational Potential and Therapeutic Strategies of Stem Cells in Livestock and Companion Animals: An Update and Way Forward. *Stem Cells and their Therapeutic Applications: The Indian Prospective* ***(World Scientific Publishing)*** https://doi.org/10.1142/13891

H. Research support

DST-INSPIRE Faculty grant #DST/INSPIRE/04/2019/001239 (2020-2025)
DST-SERB Core Research Grant #CRG/2021/003382) (2022-2025)

I. Academic Responsibilities

Ad-hoc reviewer for the Review Commons (EMBO Press)
Ad-hoc reviewer for the Journal of Cellular Physiology
Ad-hoc reviewer for the European Journal of Medical Research
Ad-hoc reviewer for the Current Alzheimer Research
Ad-hoc reviewer for the Journal of Biosciences

References:

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