Vishnu Muraleedharan Saraswathy, Ph.D.

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Research Interest

During my PhD in cellular and molecular biology, I studied tissue morphogenesis in zebrafish, leading to postdoctoral research on spinal cord regeneration. I pioneered multi-omics analysis using R/Python during postdoc and contributed to key research on regeneration. Moving forward, I aim to apply my expertise in cellular, molecular, and bioinformatic methods to study fundamental and translational mechanisms of innate neuronal repair. I am also passionate about teaching and mentoring students at all levels.

Education

2015 – 2019	**Ph.D. in Cellular and Molecular Interactions** from Université Côte d'Azur, Nice, France
2010 – 2015	**Integrated B.S & M.S** from Indian Institute of Science Education and Research (IISER), Pune, India

Position & Employment

2025 – Present	**Senior Scientist,** Washington University School of Medicine, St. Louis, MO, USA
2020 – 2024	**Postdoctoral Research Associate,** Washington University School of Medicine, St. Louis, MO, USA
2015 – 2019	**Doctoral Scholar,** Université Côte d'Azur, Nice, France

Research Experience

2020 – Present	**Postdoctoral Research & Senior Scientist**
Topic:	Cellular and molecular mechanisms of neurogenesis and axon regrowth during spinal cord regeneration.
Techniques/Skills:	Multiomics analysis, R/Python programming, Shiny App development, Database management, Bash scripting, CRISPR/Cas9, Adult tissue histology, Transgenic/knock-in fish generation, Drug treatments, Axon tracing, Electrical Stimulation, Grant writing, Mentoring, Teaching, Presentation.
Mentor:	Dr. Mayssa Mokalled, Associate Professor, Washington University School of Medicine in St. Louis, Missouri, USA

2015 – 2019 **Ph.D. Thesis**

Topic: Analyzing the role of *mib1* in non-canonical Wnt/PCP signaling during zebrafish early embryogenesis.

Techniques/Skills: CRISPR/Cas9 genome editing, Molecular biology, Western Blotting, Immunohistochemistry, in situ hybridization, Confocal/Live imaging, Micromanipulation, Zebrafish handling and fish facility maintenance.

Mentor: Dr. Maximilian Fürthauer, Team Leader, Institute of Biology, Nice, France

2013 – 2015 **Master Thesis & Semester Projects**

Topics: 1) The role of actin regulatory proteins in polarity and hexagonal packing of epithelial cells in early Drosophila embryogenesis. 2) To Identify and characterize proteins in early Drosophila embryo using monoclonal antibodies from neuronal hybridoma.

Techniques/Skills: Drosophila genetics, Drosophila handling and maintenance, Immunohistochemistry

Mentor: Dr. Richa Rikhy, Professor and Chair of Biology, IISER Pune, Maharashtra, India

Honors & Awards

2024 **HOPE Center Award** for best talk from the Hope Center for Neurological Disorders at the Washington University in St. Louis.

2023 **Frederick Seil Trainee Award** for best poster presentation at the International Symposium on Neural regeneration (ISNR-2023).

2022

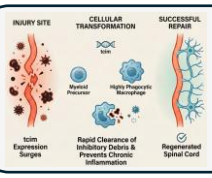
1. **Awarded FY23 - Postdoctoral seed of independence Grant ($10,000)-** for developing an innovative project that could provide a platform for independent research career.
2. **Best Poster Award** - Midwest Zebrafish conference 2022
3. **Rita Levi-Montalcini Award** for best poster presentation at the annual retreat**.**

2015 **Awarded Labex -** "Laboratoire d'Excellence" Fellowship for pursuing PhD thesis.

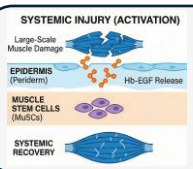
2010 **Awarded INSPIRE** Fellowship (Innovation in Science Pursuit for Inspired Research) by the Department of Science & Technology for pursuing Int. BS-MS degree.

Publications

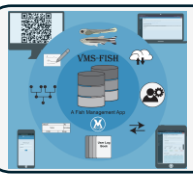
Peer reviewed publications



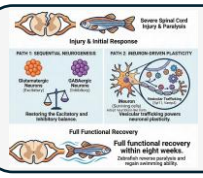
1. **Elevated phagocytic capacity directs innate spinal cord repair.** Klatt Shaw, D., Saraswathy, V.M., McAdow, A.R., Zhou, L. et al., & Mokalled, M.H., *In press*, Cell Reports, 2026, bioRxiv doi: https://doi.org/10.1101/2024.06.11.598515.



2. **Hb-EGF directs systemic muscle repair.** Dean*, H.C., Saraswathy*, V.M., Saini, A., Nachadalingam, S., McAdow, J., Tendolkar, A., Mokalled, M.H. and Johnson, A., *First authors, Development 2026, dev.204993, [PMID:41717725].

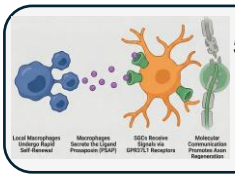


3. **VMS-Fish: A comprehensive application for zebrafish husbandry management.** Saraswathy#, V.M., & Mokalled#, M.H., #Corresponding authors Zebrafish 2025, 22(2):59-63, [PMID:40195949]

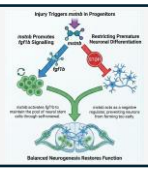


4. **Single-cell analysis of innate spinal cord regeneration identifies intersecting modes of neuronal repair.** Saraswathy, V.M., Zhou, L. & Mokalled, M.H. Nat Commun 15, 6808 (2024), [PMID:39147780]

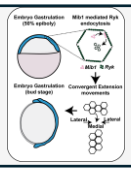
"Reported by 24 news outlets & NIH Director's Blog"



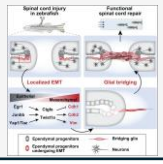
5. **Self-renewing macrophages in dorsal root ganglia contribute to promote nerve regeneration.** Feng, R., Saraswathy, V.M., Mokalled, M.H. & Cavalli, V. Proc Natl Acad Sci U S A 120, e2215906120 (2023), [PMID:36763532]



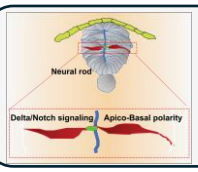
6. **Myostatin is a negative regulator of adult neurogenesis after spinal cord injury in zebrafish.** Saraswathy*, V.M., Zhou*, L., McAdow, A.R., Burris, B., Dogra, D., Reischauer, S., & Mokalled, M.H. *First authors Cell Rep 41, 111705 (2022), [PMID:36417881]



7. **The E3 ubiquitin ligase mindbomb1 controls planar cell polarity-dependent convergent extension movements during zebrafish gastrulation.** Saraswathy, V.M., Kurup, A.J., Sharma, P., Polès, S., Poulain, M. & Fürthauer M. Elife. 2022 Feb 10;11: e71928., [PMID:35142609]



8. **Localized EMT reprograms glial progenitors to promote spinal cord repair.** Klatt- Shaw*, D., Saraswathy*, V.M., Zhou*, L., McAdow, A.R., Burris, B., Morris, S.A., Dietmann, S. & Mokalled, M.H. *First authors Dev Cell 56, 613-626 e617, 2021, [PMID:33609461]



9. **Notch-mediated inhibition of neurogenesis is required for zebrafish spinal cord morphogenesis.** Sharma, P., Saraswathy, V.M., Xiang, L. & Fürthauer, M. Scientific Reports volume 9, 9958 (2019), [PMID:31292468]

Publications under revision and in preparation.

10. **Hapln1-HA signaling promotes progenitor cell proliferation and spinal cord regeneration.** Xu, Y., Zhou, L., Saraswathy, V.M., McAdow, A.R., Zhou & Mokalled, M.H. bioRxiv, doi: https://doi.org/10.64898/2026.03.28.714985

11. **Transient activation of potent progenitor cells is required for spinal cord regeneration.** Weinholtz, C.A., Zhou, L., Saraswathy, V. M., Xu, Y., Shaw, D.K., et al., & Mokalled, M.H., bioRxiv, doi: https://doi.org/10.64898/2026.02.04.703854

12. **Conserved mechanisms of plasticity-driven neuronal repair.** Saraswathy[#], V.M., McAdow, A.R., Zhou, L. & Mokalled[#], M.H. In preparation. [#]Corresponding authors.

Oral Presentations & Posters at International Conferences

1. **Cross-species comparison reveals the mechanisms of neuronal plasticity during spinal cord regeneration.** Saraswathy, V.M., Khabooshan, M.A., Douthitt, K.S., Kaslin, J., Geoffroy, C.G. & Mokalled, M.H. Oral Presentation, International Society for Regenerative Biology (ISRB) Conference, 2025

2. **Single-cell analysis of innate spinal cord regeneration identifies intersecting modes of neuronal repair.** Saraswathy, V.M., Zhou, L. & Mokalled, M.H. Poster, International Spinal Research Trust meeting (ISRT), 2024.

3. **Single-cell transcriptomics reveal a pro-regenerative neuron population in adult zebrafish.** Saraswathy, V.M., Zhou, L. & Mokalled, M.H. Flash talk & Poster. International Symposium on Neural regeneration (ISNR), 2023.

4. **Single-cell atlas of the regenerating spinal cord identified injury-induced neuron population –** Saraswathy, V.M., Zhou L, & Mokalled MH. Oral Presentation, The 17th International Zebrafish Conference, 2022, Montreal, Canada & Virtual

5. **Myostatin is a negative regulator of adult neurogenesis in zebrafish –** Saraswathy, V.M., Zhou, L, McAdow, A.R., Burris, B., & Mokalled, M.H. Oral presentation, 16th International Zebrafish Conference, 2021, Online

6. ***mindbomb1* is important for non-canonical Wnt/PCP signaling during zebrafish early embryogenesis –** Saraswathy, V.M., Kurup, A.J., Sharma, P., Polès, S., & Fürthauer, M. Oral Presentation, EMBO workshop, Limb Development and Regeneration: New Tools for a Classic Model System, 2019, EMBL Barcelona, Spain.

7. **Delta/Notch signaling is essential for the establishment of apico-basal polarity in the zebrafish spinal cord –** Saraswathy, V.M., Sharma, P., Xiang, L. & Fürthauer, M. Oral presentation. EMBO conference, Cell Polarity and Membrane dynamics, 2017, San Feliu de Guixols, Spain.

Teaching & Mentoring Experience

2023	**Summer Bootcamp for transcriptomic analysis of single cell RNA sequencing data.**
2023	**Lecture in Developmental Biology course of the Developmental, Regenerative & Stem Cell Biology graduate program at WashU titled** "Introduction to regeneration biology."
2021 – 2023	**Lectures in Postbaccalaureate Program in Developmental Biology, Cell Biology & Regenerative medicine.** (Lecture 1: Introduction to online tools in biological research, Lecture 2: Introduction to Single cell RNA sequencing and analysis using R.)
2020 – present	**Bench mentored students at different levels** (2 - Ph.D. students, 4 - undergraduates, 4 - Interns, 1 - post baccalaureate and 1 - Bioinformatician)

Outreach Activities

2020 – 2021	**Executive Committee Member**, Washington University Postdoc Society (WUPS). Coordinated professional development and advocacy for postdocs.
2018 – 2019	**Science Communicator**, **Fête de la Science.** Promoted scientific literacy to students and public.
2018 – present	**Founder and Scientific Content Creator.** Communicating complex biological research to global audiences through YouTube channel "**Bio sapiens**".

References

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