

Harini Iyer

Assistant Professor of Biosciences, Rice University

Members of my laboratory seek to decipher the complex interplay between the nervous and immune systems during development, homeostasis, and in neurodegeneration from the perspective of microglia, the sentinel immune cells of the brain. Our primary objective is to understand the fundamental principles of microglia biology and the activation of lysosomal pathways in these critical glial cells. We investigate microglia in their niche using zebrafish by exploiting the many experimental advantages of this vertebrate model organism, such as the accessibility to live imaging, the feasibility of large-scale CRISPR screens, and the availability of transgenic tools to visualize microglia in vivo.

Lab website: <https://iyerlaboratory.org/>

Education and Training

Stanford University	Postdoctoral Fellowship	2023
University of Illinois at Urbana-Champaign	Ph.D.	2017

Research Experience

Postdoctoral Research Scholar 2017 - 2023

Illuminating the cell biology of microglia using zebrafish. I defined a lysosomal regulatory circuit essential for the chemotaxis and function of microglia and developed tools to visualize the endolysosomal pathway in vivo. I demonstrated that the Chloride Channel CIC-7 is essential for phagocytic clearance by microglia. I performed CRISPR screens in zebrafish to elucidate the functions of genes mutated in Alzheimer's disease patients with a special focus on genes enriched in microglia and expressed in lysosomal compartments.

Graduate Research Assistant 2010 - 2017

Germ cell development in free-living and parasitic flatworms. My graduate research revealed that the transcription factor NF-YB and the RNA-binding protein Boule are required for the maintenance of male germline stem cells in free-living planarians. I also contributed to the understanding of somatic and germline stem cells in parasitic schistosomes.

Grants and Fellowships

- **BrightFocus Foundation Postdoctoral Fellowship** (*Role: PI*) 2022 - 2024
- **Stanford Alzheimer's Disease Research Center and National Institute on Aging Developmental Project Award** (*Role: PI*) 2021 - 2023
- **American Heart Association Postdoctoral Fellowship** (*Role: Fellow*) 2018 - 2020
- **School of Medicine Dean's Postdoctoral Fellowship** (*Role: Fellow*) 2017 - 2018
- **Block Grant Fellowship** (*Role: Fellow*) 2010

Honors and Awards

- Intersections Science Fellows Symposium Associate 2023
- Justice, Equity, Diversity, and Inclusion Champion Award, Stanford University 2022
- NK and Irene Cheung Family Scholar Award, Keystone Symposia 2022
- Marine Biological Laboratory Endowed Scholarship 2019
- Tunji Toogun Research Excellence Award, University of Illinois 2018
- Trainee Award, Symposium for International Research and Innovations in Schistosomiasis 2016

Selected Publications

1. **Iyer, H.**, Talbot, W.S. 2024. The Cl⁻ transporter CIC-7 is essential for phagocytic clearance by microglia. *J Cell Sci* 137(4): jcs261616.
2. **Iyer, H.**, Shen, K., Meireles, A.M., Talbot, W.S. 2022. A lysosomal regulatory circuit essential for the development and function of microglia. *Sci Adv* 8(35):eabp8321.
3. Gan, L., Seki, A., Shen, K., **Iyer, H.**, Han, K., Hayer, A., Wollman, R., Ge, X., Lin, J.R., Dey, G., Talbot, W.S., Meyer, T. 2019. The lysosomal GPCR-like protein regulates Rag and mTORC1 localization and activity. *Nat Cell Biol* 21(5):614-626.
4. Meireles, A.M., Shen, K., Zoupi, L., **Iyer, H.**, Bouchard, E.L., Williams, A., Talbot, W.S. 2018. The lysosomal transcription factor TFEB regulates myelination downstream of the Rag-Ragulator complex. *Dev Cell* 47(3):319-330.
5. **Iyer, H.**, Issigonis, M., Sharma, P.P., Extavour, C.G., P.A. Newmark. 2016. A premeiotic function for *boule* in the planarian *Schmidtea mediterranea*. *Proc Natl Acad Sci USA* 113(25): E3509-18.
6. **Iyer, H.**, Collins III, J.J., P.A. Newmark. 2016. NF-YB regulates spermatogonial stem cell self-renewal and proliferation in the planarian *Schmidtea mediterranea*. *PLoS Genet* 12(6): e1006109.
7. Collins III, J.J., Wendt, G.R., **Iyer, H.**, P. A. Newmark. 2016. Stem cell progeny contribute to the schistosome host-parasite interface. *eLife*. 5:243.
8. Collins III, J.J., Wang, B., Lambrus, B.G., Tharp, M., **Iyer, H.**, and P. A. Newmark. 2013. Adult somatic stem cells in the human parasite, *Schistosoma mansoni*. *Nature*. 494: 476-479.

Other Publications

9. Naik, M., Raichurkar, A., Bhandodkar, B.S., Varun, B.V., Bhat, S., Kalkhambkar, R., Murugan, K., Menon, R., Bhat, J., Paul, B., **Iyer, H.**, et al. 2015. Structure Guided Lead Generation for *M. tuberculosis* Thymidylate Kinase (Mtb TMK): Discovery of 3-Cyanopyridone and 1,6-Naphthyridin-2-one as Potent Inhibitors. *J Med Chem*. 58(2): 753-66.
10. Balasubramanian, V., Solapure, S., **Iyer, H.**, et al. 2014. Bactericidal activity and mechanism of action of AZD5847, a novel oxazolidinone for treatment of tuberculosis. *Antimicrob Agents Chemother*. 58(1): 495-502.
11. Gising, J., Nilsson, M.T., Odell, L.R., Yahiaoui, S., Lindh, M., **Iyer, H.**, et al. 2012. Trisubstituted imidazoles as *Mycobacterium tuberculosis* glutamine synthetase inhibitors. *J Med Chem*. 55(6): 2894-8.
12. Andaloussi, M., Lindh, M., Björkelid, C., Suresh, S., Wieckowska, A., **Iyer, H.**, et al. 2011. Substitution of the phosphonic acid and hydroxamic acid functionalities of the DXR inhibitor

FR900098: An attempt to improve the activity against *Mycobacterium tuberculosis*. *Bioorg Med Chem Lett.* 21(18): 5403-7.

13. Andaloussi, M., Henriksson, L.M., Więckowska, A., Lindh, M., Björkelid, C., Larsson, A.M., Suresh, S., **Iyer, H.**, et al. 2011. Design, synthesis, and X-ray crystallographic studies of α -aryl substituted fosmidomycin analogues as inhibitors of *Mycobacterium tuberculosis* 1-deoxy-D-xylulose 5-phosphate reductoisomerase. *J Med Chem.* 54(14): 4964-76.

Mentoring and Teaching

• Ranel Tuplano	Stanford Summer Research Program* scholar	2022
• Vikram Mani	High School researcher	2022
• Dunya Shuman	Community College Outreach Program* researcher	2022
• Rotation students	Department of Developmental Biology, Stanford University	2017 - 2022
• Caitlin Dingwall	Undergraduate researcher	2016

** These programs are designed to enhance diversity, inclusion, and equity in STEM fields*

• Developmental Biology (MCB 410)	Teaching Assistant and Journal Club Discussion leader	2013
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Invited Presentations

• Systems Neuroimmunology meeting, Banbury Center CSHL, Huntington, NY	2024
• Zebrafish Disease Models Society, 16th annual conference, Durham, NC	2023
• Structural Birth Defects Trainee Symposium (virtual)	2023
• University of Massachusetts Amherst, Department of Biology, Amherst, MA	2023
• Keystone Symposia: Neuroimmune Interactions, Vancouver, BC	2023
• University of Wyoming, Department of Molecular Biology, Laramie, WY	2023
• University of New Mexico, Department of Biology, Albuquerque, NM	2023
• University of Utah, Department of Biology, Salt Lake City, UT	2023
• University of Kansas, Department of Molecular Biosciences, Lawrence, KS	2023
• Ethel Browne Harvey Postdoctoral Seminar Series (virtual)	2022
• Rice University, Department of Biosciences, Houston, TX	2022
• UTHealth San Antonio, Department of Cellular and Integrative Physiology, San Antonio, TX	2022
• International Society for Molecular Neurodegeneration (virtual)	2022
• Aquatic Models of Human Disease conference, Woods Hole, MA	2022
• University of San Francisco, Department of Biology, San Francisco, CA	2022
• Syracuse University, Early Career Research in Neuroscience seminar series (virtual)	2022
• International Zebrafish Society, 17th annual conference, Montreal, QC	2022
• Zebrafish Disease Models Society, Neural Disorders Research Interest Group (virtual)	2019
• Society for Developmental Biology, 75th annual conference, Boston, MA	2016
• Symposium for International Research and Innovations in Schistosomiasis, Washington, DC	2016

- **North American Planarian Meeting, Chicago, IL** 2015
- **Germ Cell Meeting, Cold Spring Harbor Laboratory, NY** 2014

Community Service and Volunteering

- **Member-at-large** Early Career Investigator (ECI) committee, Zebrafish Disease Models Society 2023 - 2025
- **Member** Publication and Communications Committee, Society for Developmental Biology 2023 - 2027
- **Invited speaker** Palo Youth in Medicine Outreach, Palo Alto High School 2022
- **Research mentor** Community College Outreach Program, Stanford University 2022
- **Leadership committee** Community College Outreach Program, Stanford University 2021 - 2022
- **Journal Club leader** Justice, Equity, Diversity, and Inclusion committee, Alzheimer's Disease Research Center, Stanford University 2021 - 2022
- **Organizer** Neuroimmunity Group Seminar Series, Stanford University 2019 - 2022
- **Instructor** Zebrafish injection training camp, Departments of Developmental Biology and Genetics, Stanford University 2018 - 2019
- **Mentor** ADVANCE program, Stanford University 2018 - 2019
- **Application reviewer** Stanford Summer Research Institute program, Stanford University 2018 - 2019
- **Instructor** Splash, Stanford University 2018
- **Outreach volunteer** California Academy of Sciences NightLife 2018
- **Outreach volunteer** Science and Technology Camp, Orpheum Children's Museum, Urbana 2012 - 2014
- **Member** Graduate Student Council, University of Illinois at Urbana-Champaign 2012 - 2014
(Chair 2012 - 2015)
- **Member** Student Seminar Committee, University of Illinois at Urbana-Champaign 2012 - 2014
(Chair 2012 - 2015)

Training and Workshops

- **BrightFocus Alzheimer's Fast Track** 2022
- **Zebrafish Development and Genetics course, Marine Biological Laboratory** 2019
- **Commercialization intern, Office of Technology Management, University of Illinois** 2015 - 2016