

Ramalakshmi Ramasamy, Ph.D.

16 Winchester Ct, Farmington, CT - 06032

Email: ramalakshmiramaswamy@gmail.com

Email: ramalakshmi.ramasamy@jax.org

LinkedIn: Ramalakshmi Ramasamy

ORCID: 0000-0003-4067-0511

EDUCATION

Ph.D. in Biomedical Sciences Department of Neuroscience and Center on Aging University of Connecticut Health Center, Farmington, CT 3.965/4 CGPA	2018-2022
Master of Technology Biotechnology Concentration P.S.G College of Technology, Coimbatore, India 9.3/10 CGPA (First class with Proficiency – First Rank Holder)	2011-2013
Bachelor of Technology Biotechnology Concentration Sathyabama University, Chennai, India 86% (First class with Distinction – Third Rank Holder)	2005-2009

SKILLS

- **In vivo/ in vitro models:** mouse models, human tissues, cell lines, iPSCs and zebrafish
- **Molecular Biology:** DNA/RNA extraction, cDNA synthesis, q-PCR, cloning techniques, mRNA stability assays, southern blotting, western blotting, ELISA
- **Sequencing:** Tissue dissociation for single cell RNA sequencing, optimization and preparation of libraries for chromatin-immunoprecipitation (ChIP) sequencing, poly-A sequencing
- **CRISPR/Cloning:** designing, engineering, cloning and evaluating CRISPR guide RNAs, transfection into desired cell lines, screening and expansion of CRISPR-modified cell colonies
- **Microbiology:** plating, transformation, plasmid isolation, plasmid sequencing
- **Histology:** formalin-fixed, paraffin embedded tissue processing and sectioning, whole-mount and section *in situ* hybridization, immuno-histochemistry, staining techniques.
- **Surgery:** surgical bladder catheterization for cystometry in mice, tissue Pharmacomyography, perfusion
- **Science Communication:** Grant-writing, scientific writing/publishing (original research and reviews), peer-reviewing journal manuscripts and conference abstracts, scientific communication with non-science audience.
- **Bioinformatics:** Running pipelines and analysis for single cell RNA sequencing, bulk RNA sequencing
- **Programming languages:** Basics of C, C++, SQL

RESEARCH EXPERIENCE

Postdoctoral Associate

Oct 2022 till date

The Jackson Laboratory for Genomic medicine, Farmington, CT, USA

- Studying the link between developmental senescence and oncogene-induced senescence in the human placenta
- Working on the human placenta as part of the KAPP-Sen Tissue Mapping Center Collaborative aimed to map senescent cells in the human body (SenNET Consortium).
- Single cell dissociation and RNA sequencing to study single cell transcriptomic signatures in the placenta
- iPSC culture and trophoblast cell culture and differentiation to study developmental senescence programs and cell type differentiation.

Principal Investigators:

Dr. Paul Robson, Ph.D., Professor and Director, Single Cell Biology

Doctoral Candidate**Aug 2018 to Sep 2022****Department of Neuroscience, UConn Health, Farmington, CT, USA**

- Investigated impact of aging and neurological diseases on bladder function via physiological and molecular assays in mice
- Established the role of multiple sclerosis (MS)-associated demyelination in urinary dysfunction utilizing the cuprizone model of MS
- Designed and analyzed experiments to determine the role of HCN in bladder function
- Pioneered experiments establishing the role of the urothelium in bladder dysfunction with aging

*Principal Investigators:***Dr. Phillip Smith, M.D., FPMRS**, Professor of Surgery, UConn Health**Dr. Stephen Crocker, Ph.D.**, Associate Professor, Neuroscience, UConn Health**Research Scholar****Dec 2015 to Jun 2018****UNC Lineberger Comprehensive Cancer Center, Chapel Hill, NC, USA**

- Constructed and created CRISPR-Cas9 guide RNA clones to delete several specific regions of p16INK4 mRNA in HeLa cells
- Studied the mechanisms behind the uniquely high half-life of p16INK4 mRNA among other tumor-suppressor genes
- Performed bioinformatic analyses on determining tumor suppressor genes with circular mRNA

*Principal Investigator:***Dr. Norman E. Sharpless, MD**, Former Director, National Cancer Institute, NIH

Former Professor of Medicine and Genetics Chair, UNC Chapel Hill

Former Director of UNC Lineberger Comprehensive Cancer Center, NC, USA

Master's Research Assistant**Jul 2012 to Jun 2013****Genome Institute of Singapore (A*STAR), Biopolis, Singapore**

- Optimized antibodies for chromatin immunoprecipitation (ChIP) of specific histones using dot blotting
- Optimized and constructed ChIP-sequencing libraries for human brain tissues
- Studied epigenetic factors (specifically H3K27ac) contributing to autism spectrum disorder (ASD) for a histone acetylome-wide association study (HAWAS).

*Principal Investigator:***Dr. Shyam Prabhakar, Ph.D.**, Associate Director, Integrated Genomics, A*STAR GIS Singapore**Bachelor's Thesis Project****Feb 2009 to Nov 2009****Genome Institute of Singapore (A*STAR), Biopolis, Singapore**

- Construction of plasmids for in vivo enhancer assays in zebrafish and mouse
- Experimentally validated Human Accelerated Conserved Noncoding Sequences (HACNS) predicted computationally, as putative enhancers
- Setup zebrafish breeding, performed embryo microinjections, and captured images using fluorescent microscopy
- Performed molecular and histological experiments for other projects in the lab

*Principal Investigator:***Dr. Shyam Prabhakar, Ph.D.**, Associate Director, Integrated Genomics, A*STAR GIS Singapore**Bachelor's Summer Project****Sep 2008 to Nov 2008****Madras Veterinary College, Chennai, India**

- Extracted DNA from blood and tissue samples of poultry and qPCR to detect the parasitic load of Eimeria.

*Principal Investigator:***Dr. G. Dhinakar Raj, Ph.D.**, Department of Immunobiotechnology, TANUVAS

TEACHING/WORK EXPERIENCE

Assistant Professor, Department of Biotechnology

Jul 2013 to Nov 2015

PSG College of Technology, Coimbatore, India

Responsibilities:

- Development and implementation of innovative mentoring methods
- Guide, mentor, and evaluate undergraduate students in research projects
- Courses instructed: Cell Biology, Animal Biotechnology, and Developmental Biology

Program Developer, WIPRO Technologies

Mar 2010 to Aug 2011

PSG College of Technology, Coimbatore, India

Responsibilities:

- Building and maintaining databases using ORACLE/SQL.

PROFESSIONAL MEMBERSHIPS / ENGAGEMENTS

- Manuscript Peer-Reviewer, Brain, Behavior and Immunity, 2022
- Abstract Reviewer, Gerontological Society of America (GSA), 2022
- Manuscript Peer-Reviewer, Frontiers in Aging, 2021
- Member, Society of Pelvic Research (SPR), 2020-2021
- Member, Gerontological Society of America (GSA), 2020-present
- Member, International Continence Society (ICS), 2021-present
- Member, Emerging Scholar and Professional Organization, GSA, 2021-present
- Affiliate, The Connecticut Institute for the Brain and Cognitive Sciences, 2020- present

MENTORSHIP ROLES

- 1. Medical Student Independent Study Mentor, Nadav Mortman**, UConn Health School of Medicine, Farmington, CT, 2021
 - Provided primary mentorship for a 4th-year medical student to complete a project as part of his Medical School Capstone Fellowship.
 - Provided expertise and lead in constructing the project, building and optimizing protocols and the apparatus, troubleshooting experimental setup, and training towards becoming an independent scientist.
 - Provided guidance for successful completion of the project, leading towards a significant publication.
- 2. Master's Student (Fulbright Fellow) Independent Study Mentor, Alya Alobaidi**, University of Hartford, Hartford, CT, 2021
 - Provided mentorship for a final year Master's student to learn all the techniques required to complete her Master's thesis as part of her Fulbright Fellowship.
 - Provided expertise in trouble-shooting protocols and designing experiments.
 - Provided guidance for successful completion of the project, leading towards a publication.
- 3. Graduate student Mentor, Eric Woon**, Biomedical Engineering Ph.D. Program, University of Connecticut, Storrs, CT, 2021-22
 - Provided primary mentorship for a second-year Graduate student to learn crucial surgical techniques like cystometry, required to set up his Ph.D. thesis work.
 - Provided engineering and scientific guidance in constructing several projects and troubleshooting experimental setups and training towards becoming an independent scientist.
- 4. Tutor, Foundations in Biomedical Sciences Tutor Program**, University of Connecticut Health Center, Farmington, CT, Spring 2022.
 - Led and moderated discussions with younger graduate students in the Biomedical Sciences Ph.D. program and provided further clarity on difficult concepts.
- 5. Undergraduate thesis Faculty Mentor**, Department of Biotechnology, PSG College of Technology, India, 2015
 - Primary faculty mentor for 3 Undergraduate students working on anti-melanogenic effects of plant extracts on zebrafish embryos.
 - Provided primary mentorship, guidance towards completion of the project, and evaluation.
- 6. Undergraduate thesis Faculty Mentor**, Department of Biotechnology, PSG College of Technology, India, 2014
 - Primary faculty mentor for 2 Undergraduate students working on teratogenic effects of plant extracts on zebrafish embryos.
 - Provided primary mentorship, guidance towards completion of the project, and evaluation.

PUBLICATIONS

1. **Ramasamy R.**, Baker D., Lemtiri-Chlieh F., Rosenberg D., Woon E., Al-Naggar, I. M., Hardy.C.C., Levine, E. S., Kuchel, G. A., Smith P. P. and Bartley J. Loss of resilience contributes to detrusor underactivity in advanced age. *Biogerontology*. (Accepted)
2. **Ramasamy R.**, Crocker S. J., Smith P. P. Animal Models of Multiple Sclerosis and the Lower Urinary Tract. In *Martin C., Patel V. B., Preedy V. R. (Eds.), Handbook of Animal Models in Neurological Disease*. 2022. Elsevier. (Accepted)
3. **Ramasamy R.**, Hardy, C. C., Crocker, S. J., & Smith, P. P. (2022). Cuprizone-mediated demyelination reversibly degrades voiding behavior in mice while sparing brainstem reflex. *Journal of neuroscience research*, 10.1002/jnr.25065.
4. Hardy, C. C., **Ramasamy R.**, Rosenberg, D. A., Kuchel, G. A., Yan, R., Hu, X., & Smith, P. P. (2022). Alzheimer's disease amyloidogenesis is linked to altered lower urinary tract physiology. *Neurourology and urodynamics*, 10.1002/nau.24952
5. Lemtiri-Chlieh, F., Baker, D. S., Al-Naggar, I. M., **Ramasamy R.**, Kuchel, G. A., Levine, E. S., Robson, P., & Smith, P. P. (2022). The Hyperpolarization Activated, Cyclic Nucleotide Gated Channel Resides on Myocytes in Mouse Bladders and Contributes to Adrenergic-Induced Detrusor Relaxation. *American journal of physiology. Regulatory, integrative and comparative physiology*, 10.1152/ajpregu.00277.2021. PMID: 35503519
6. **Ramasamy R.**, Smith PP. Animal modeling of lower urinary tract dysfunction associated with multiple sclerosis: Part I: Justification of the mouse model for MS research. *Neurourol Urodyn*. 2021 Apr;40(4):950-957. doi: [10.1002/nau.24649](https://doi.org/10.1002/nau.24649). Epub 2021 Mar 14. PMID: 33719097; PMCID: PMC8137595.
7. **Ramasamy R.**, Smith PP. Animal modeling of lower urinary tract dysfunction associated with multiple sclerosis: PART 2: Mouse models for multiple sclerosis research. *Neurourol Urodyn*. 2021 Apr;40(4):958-967. <https://doi.org/10.1002/nau.24654>. Epub 2021 Mar 19. PMID: 33739481; PMCID: PMC8137599.
8. Sun W., Poschmann J., Cruz-Herrera Del Rosario R., Parikshak N. N., Hajan H. S., Kumar V., **Ramasamy R.**, Belgard T. G., Elanggovan B., Wong C. C. Y., Mill J., Geschwind D. H. , Prabhakar S. Histone Acetylome-wide Association Study of Autism Spectrum Disorder. *Cell*. 2016 Nov 17;167(5):1385-1397.e11. doi: <https://doi.org/10.1016/j.cell.2016.10.031>. PMID: 27863250.

Manuscripts under preparation (anticipating being published in 2023):

9. **Ramasamy R.**, Mortman N., Woon E, Smith P. P. and Bartley J. The impact of urothelium on age-related length-tension adaptations of bladder detrusor smooth muscle. *Aging Cell*. (In preparation)
10. Al-Obaidi A., **Ramasamy R.**, Bartley J., Yan, R. and Hu, X. Urinary pathophysiology of an Alzheimer's disease model. *Neurourology and Urodynamics*. (In preparation)

CONFERENCE/ SYMPOSIUM PRESENTATIONS

1. Mortman N, **Ramasamy R**, Smith P. Elderly Mouse Detrusor Maintains Its Peak Force Of Contraction Over Time. *Innov Aging*. 2022 Dec 20;6(Suppl 1):665. doi: 10.1093/geroni/igac059.2451. PMCID: PMC9766828.
2. **Ramasamy R**, Hardy CC, Crocker SJ, Smith PP. Cuprizone-Mediated Demyelination Reversibly Degrades Voiding Behavior in Mice while Sparing Brainstem Reflex. Selected Oral Presentation at the 20th Annual Neuroscience Retreat, UCONN Health. May 2022.
3. Alobaidi A., **Ramasamy R.**, Bartley J., Hardy C., Smith P. P. Investigating changes in bladder tissue function in AppNL-G-F mouse model of Alzheimer's disease. Selected Poster Presentation at the 20th Annual Neuroscience Retreat, UCONN Health. May 2022.
4. **Ramasamy R**, Hardy CC, Crocker SJ, Smith PP. Cuprizone-Mediated Demyelination Reversibly Degrades Voiding Behavior in Mice while Sparing Brainstem Reflex. Selected Datablitz Presentation at 24th Neuroscience at Storrs, UCONN. May 2022.
5. **Ramasamy R**, Al-Obaidi A, Smith PP. Stabilizing Role of HCN Channels on post-cAMP Mechanisms of Detrusor Myocyte Control. *Basic Science Poster Presentation at Society of Urodynamics, Female Pelvic Medicine & Urogenital Reconstruction (SUFU) Winter Meeting 2022*. February 22-26, 2022.
6. Mortman N, **Ramasamy R**, Smith P. Elderly Mouse Detrusor Maintains Its Peak Force Of Contraction Over Time. *Basic Science Poster Presentation at Society of Urodynamics, Female Pelvic Medicine & Urogenital Reconstruction (SUFU)*

Winter Meeting 2022. February 22-26, 2022.

7. **Ramasamy R**, Hardy CC, Crocker SJ, Smith PP. Remyelination Improves Voiding Dysfunction in a Mouse Model of Multiple Sclerosis. *Innovation in Aging*, Volume 5, Issue Supplement_1, 2021, Pages 639–640, <https://doi.org/10.1093/geroni/igab046.2413>
8. Hardy CC, **Ramasamy R**, Rosenberg D, Scarpa P, Hu X, Kuchel G, Smith P. Loss of Awareness or Urinary Dysfunction? Investigating Amyloidosis and Urinary Physiology in a Transgenic Mouse, *Innovation in Aging*, Volume 5, Issue Supplement_1, 2021, Page 530, <https://doi.org/10.1093/geroni/igab046.2045>
9. **Ramasamy R**, Hardy CC, Smith PP. Impact of Central Nervous System Demyelination and Remyelination on Urinary Physiology. Scientific Open Discussion Presentation at International Continence Society (ICS) 2021. December 11-13, 2020. <https://www.ics.org/2021/abstract/348>
10. **Ramasamy R**, Rosenberg DA, Hardy CC, Crocker SJ, Smith PP. Urinary Pathophysiology of a Demyelination Model of Multiple Sclerosis. *Invited Podium Talk at Society of Urodynamics, Female Pelvic Medicine & Urogenital Reconstruction (SUFU) Winter Meeting 2021*. February 25-27, 2021.
11. **Ramasamy R**, Rosenberg DA, Hardy CC, Crocker SJ, Smith PP. Effects of CNS Demyelination and Myelin Recovery on Urinary Physiology. *Innovation in Aging*, Volume 4, Issue Supplement_1, 2020, Pages 119–120, <https://doi.org/10.1093/geroni/igaa057.393>
12. Hardy C, Rosenberg D, **Ramasamy R**, Hu X, Smith P. Alzheimer's Disease-Associated Pathology in a Transgenic Mouse Model Results in Altered Voiding Function. *Innov Aging*. 2020;4(Suppl 1):117. Published 2020 Dec 16. doi:10.1093/geroni/igaa057.386
13. Rosenberg D, Hardy C, **Ramasamy R**, Smith P. Detrusor underactivity as an HCN-Mediated Failure of Resilience in Aging. *Innov Aging*. 2020;4(Suppl 1):131. Published 2020 Dec 16. doi:10.1093/geroni/igaa057.431
14. **Ramasamy R**, Rosenberg DA, Hardy CC, Crocker SJ, Smith PP. Urinary Pathophysiology of a Demyelination Model of Multiple Sclerosis. *Oral Presentation at Society for Pelvic Research (SPR) 2020*. December 11-13, 2020.
15. **Ramasamy R**, Janakiraman K, Sharpless N, Laederach A. Stability of p16Ink4a and p14ARF mRNA in HeLa Cells. *Poster Presentation at 2017 Symposium on RNA Biology XII: RNA Tool and Target, UNC Chapel Hill*. October 19-20, 2017.

COMMUNITY OUTREACH

1. **Science Fair Judge** at Edward Morley School, West Hartford, CT during the School Science Fair in May 2019.
As part of a panel of judges, evaluated science projects and poster presentations by elementary school students.
2. **STEM professional** for Lab demo/tour at Connecticut Junior Science and Humanities Symposium, March 2020.
Provided a lab demo/tour for high school students from Farmington Public School.
Talked about how it is to be a scientist and about the research focus of our lab.
Explained the mechanism of Multiple sclerosis and how the bladder is affected by this disease and demonstrated how we test bladder muscle performance using experiments.
3. **Event Organizer** at Dimension Sciences - Panel Discussion on Challenges and Disparities in STEM, October, 2020.
 - Gathered panelists for the panel discussion on: Challenges and Disparities in STEM
4. **Science Panelist** at Young Explorers in Science (YES), UConn Health, December 2020- December 2021.
 - Viruses: How do they work? - New Britain High School, CT, January 2021.
 - How do vaccines work and why are they important? How COVID vaccines work? - New Britain High School, CT, February 2021.
5. **STEM Research Panelist** at Connecticut Junior Science and Humanities Symposium, January 2021- March 2021.
 - Discussed my research, how a typical Ph.D. program is, and things to consider for graduate school
 - Over 160 High School Students and Teachers all over Connecticut participated in this Panel Discussion.
6. **Science Panelist** at Genetics Café with Connecticut Science Center and Young Explorers in Science (YES), March 2021.
 - Led discussion on genetics research and careers to Juniors and Senior Students at the East Hartford High School
7. **Demonstrating Scientist** at Chromatography demonstration with YWCA USA, New Britain, CT and Young Explorers in Science (YES), UConn Health, March 2021.
 - Conducted a chromatography experiment with Crayola markers and coffee filters virtually, while Middle school-aged girls at the YWCA New Britain followed and did experiments in their classroom.

8. **Speaker Scientist** at Agaram Tamil Padasalai, Connecticut, February 2022.
 - Discussed the Joy of Research and my Research journey with kids from Elementary- High School age.
9. **Speaker Scientist** at Skype A Scientist, November 2020 till date
 - Taught inquisitive 8th-grade students from Massachusetts the nervous system, explained the right ways to do science, and why I love being a scientist.
10. **Speaker Scientist** at North South Foundation, Connecticut, February 2022.
 - Talked about the Joy of Research and STEM to kids in Elementary School-age.
11. **STEM Showcase Volunteer at** Connecticut Science Center organized by the Young Explorers in Science (YES), UConn Health in June 2022.
 - Prepared and cast a video showing “A Day in the Life of a Scientist” during the showcase where over 300 school kids visited from in and around Connecticut.
 - Setup a booth where the kids tried to micro-pipette and observe pre-mounted slides under the microscope.