

Manpreet K. Semwal, PhD

Assistant Professor

Academic and Professional CV

Education

University of Texas Health Science Center at San Antonio (UTHSCSA):
Integrated Biomedical Sciences (IBMS) graduate program, Ph.D., Program in Molecular
Immunology and Microbiology (June 2021)

University of Mumbai, India: Master of Science (MS) in Microbiology and Immunology
(2008)

University of Mumbai, India: Bachelor of Science (BS) in Microbiology and Immunology
(2006)

Teaching Experience

Assistant Professor of Biology at Our Lady of the Lake University Aug 2024-Current

- Teaching Biology subjects including General Biology, Molecular and cellular biology, Biochemistry, Genetics, Immunology, both lectures and laboratory sessions.
- Developed and currently teaching the first-ever Immunology course at OLLU.

Guest Lecture, Obesity week at St. Mary's University, San Antonio Nov 2023

- Designed and delivered 3 comprehensive lectures to undergraduate students on implications of obesity in metabolic diseases and immune system.

Guest Instructor, ELECTIVE 506: Basic Science Training for Medical Students, Sep-Nov 2023

- Taught Fluorescence microscopy lecture and conducted hands-on training for 2nd year medical students at UT Health San Antonio.

Adjunct Instructor, St. Mary's University, San Antonio, Aug 2021-December 2021

- Taught General Biology Lab of 30 Freshmen students.

Instructor for Learning Enhancement for Achievement in Dentistry (LEAD) program, UT Health San Antonio 2021.

- Designed and taught 8-hour Cell Biology course to the undergraduates from different universities in Texas.

Co-instructor, PhD Pre-matriculation Molecular Biology, UT Health San Antonio 2020

- Designed and taught a 2-week virtual classroom course on Molecular Biology for first year PhD students at UT Health San Antonio

Guest lecture on 'T-cell development' at Texas A&M, San Antonio, 2019

Coordinator and Lecturer, Department of Microbiology and Biotechnology, S.S. & L.S. Patkar Varde College, University of Mumbai, India, 2011- 2013

- My job responsibilities as a Coordinator included interviewing course applicants for teaching positions, organizing industrial visits and recruitment opportunities for the students.
- As a lecturer I was involved in lecture planning and teaching undergraduates medical microbiology and food microbiology, conducting lab courses and invigilating university examinations. Additionally, I was also actively involved in supervising thesis of master's students as a supervisor and committee member.

Lecturer, Department of Microbiology and Biotechnology, S.S. & L.S. Patkar Varde College, University of Mumbai, India, 2010- 2011

- My job responsibilities included teaching undergraduates medical microbiology and food microbiology, conducting lab courses and invigilating university examinations. Additionally, I was a co-founder of the AIDS awareness program and departmental tech-fest at the institute.

Part-time Lecturer, Department of Biotechnology, ICLES' Motilal Jhunjhunwala College, University of Mumbai, India, 2009-2010

- My job responsibilities included lecture planning, preparation and teaching undergraduates genetics, biotechnology and industrial microbiology, conducting lab courses and invigilating examinations.

Publications

Sarah A. Wedemeyer, Nicholas E. Jones, Iwan G. A. Raza, Freedom M. Green, Yangming Xiao, **Manpreet K. Semwal**, Aaron K. Garza, Kahealani S. Archuleta, Kymberly L. Wimberly, Thomas Venables, Georg A. Holländer, Ann V. Griffith (2024) A dynamic paracrine FGF21-mTORC1/mTORC2 signaling axis regulates thymus function. Nature Aging.

*Baeuerle, E., ***Semwal, M.K.**, Zhang, N., Liang, H., Ganapathy, V., Sathavarodom, N., Fernandez, R., Wang, CP., Espinoza, S., Dong, Q., Yang, Z., Kostic, A., and Musi, N. (2023). Sevelamer Improves Insulin Sensitivity in Obese Human Subjects. (Under Review JCI Insight).

***Equal Contribution**

Semwal, M. K., Hester, A. K., Xiao, Y., Udeaja, C., Cepeda, S., Verschelde, J. S., ... & Griffith, A. V. (2022). Redox status regulates autophagy in thymic stromal cells and promotes T cell tolerance. *Proceedings of the National Academy of Sciences*, 119(40), e2204296119.

*Hester, A.K., ***Semwal, M.K.**, Cepeda, S., Xiao, Y., Rueda, M., Wimberly, K., Venables, T., Dileepan, T., Kraig, E. and Griffith, A.V., (2022). Redox regulation of age-associated defects in generation and maintenance of T cell self-tolerance and immunity to foreign antigens. *Cell reports*, 38(7), p.110363.

***Equal Contribution**

Semwal M.K., Jones N.E. and Griffith, A.V. Metabolic regulation of thymic stromal cell function (2021) *Frontiers in Immunology*, 12:636072. doi: 10.3389/fimmu.2021.636072.

Cepeda, S., Cantu, C., Orozco, S., Xiao, Y., Brown, Z., **Semwal, M.K.**, Venables, T., Anderson, M.S. and Griffith, A.V. (2018). Age-associated decline in thymic B cell expression of aire and aire-dependent self-antigens. *Cell reports*, 22(5), pp.1276-1287.

Vartak, R. S., **Semwal, M. K.**, & Bai, Y. (2014). An update on complex I assembly: the assembly of players. *Journal of bioenergetics and biomembranes*, 46(4), 323-328.

Professional Development

CIMER Research Mentor Training Workshop, October 2024

- This one-day workshop strengthened my mentoring skills and supported my development in bio STEM research. The training emphasized effective mentorship practices to promote successful research and learning outcomes.

Courage-based undergraduate research experiences (CURE) workshop, May 2024

- This three-day workshop provided valuable insights into integrating course-based undergraduate research experiences (CUREs) into my teaching. It helped me develop skills to design and implement research-focused coursework that promotes hands-on learning, enhances critical thinking, and fosters student engagement in scientific inquiry.

Entering Mentoring UT Health San Antonio, 2021

UTeach (University Teaching Excellence course) UT Health San Antonio, 2019

- During this 13-week professional development program, participants learn and practice strategies effectively conducting undergraduate science courses and courses for health professions education students. UTeach is supported by a NIH Institutional Research and Academic Career Development Award (NIH/NIGMS K12 GM111726).

Research Experience

Post-Doctoral Fellow: UT Health San Antonio, Nicolas Musi Lab, June 2021-July 2024

My post-doctoral research focused on understanding the molecular modifications that increases the risk of metabolic disorders and disability related to aging including diabetes, obesity and sarcopenia using cell cultures, animal model and conducting investigations in human subjects. My project involved cellular and molecular approach to understand the cellular complexity and plasticity in adipose and muscle tissues of obese individuals. Additionally, I worked on understanding the implications of aging and obesity in senescence. My postdoctoral research work resulted in 5 posters at local and national conferences and one publication is under review.

Ph.D. Candidate: UT Health San Antonio, Ann Griffith Lab, 2015-2021

My pre-doctoral research was focused on studying the roles of the redox regulation in thymus function. My study involved using mouse models to measure autophagy flux, mitochondrial hydrogen peroxide levels in the stromal cells of the mouse thymus in wildtype and transgenic mice overexpressing human catalase (an antioxidant) and a mouse model with beclin 1 knock-in (Becn1F121A/F121A) to study constitutively high levels of autophagy uncovers a novel aspect of thymus biology and new mechanisms moderating the risks for autoimmunity.

Non-Degree Student: UT Health San Antonio, Yidong Bai Lab, 2013-2015

I was involved in the studies understanding the role of Hsp 60 and Hsp 10 in oxidative phosphorylation and in identification of novel proteins involved in the shift of mitochondrial supercomplex.

Mentoring Experience

Training and mentoring of PhD rotation and undergraduate students in Musi lab (2021-2023)

- Olamide Bolaji, Visiting Undergraduate student for Advancing Diversity in Aging Research (HUADAR) program under Howard University, 2022.
- Marium Begum, First year rotating PhD student, Dec 2021.

Training and mentoring of PhD rotation, Master's and undergraduate students in Griffith lab (2017-2021)

- Sarah Mann, M.D. Ph.D. rotation student, UT Health San Antonio, 2020
- Nicholas Jones, Ph.D. rotation student, UT Health San Antonio, 2019
- Alyssa Schami, Ph.D. rotation student, UT Health San Antonio, 2019
- Chioma Udeaja, Master's student, UT Health San Antonio, 2019
- John Vershelde, Undergraduate student, Texas A&M, San Antonio, 2019
- Airika Lowery-Harley, Undergraduate student, University of Incarnate World, San Antonio, 2019

- Rosie Sosa, Undergraduate student, Texas A&M, San Antonio, 2018
- Allison Hester, Ph.D. rotation student, UT Health San Antonio, 2016
- Jake Gonzales, Ph.D. rotation student, UT Health San Antonio, 2016

The Centers for Applied Science and Technology (CAST) Med Mentor, 2021

- Served as a mentor to aid and help in the pathway of creating more diversified health care professionals by providing insights of my career pathways and tips for success to high school students.

Science Expo, 2019

- About 1,500 high school and college students visiting UT Health San Antonio for interactive, hands-on activities and presentations related to research careers. A multidisciplinary event where I hosted a table display with hands-on demonstrations and conversations with students. Additionally, I presented a lecture to 126 high school students discussing the fundamentals of microbiology and immunology.

STEM Scholar's program, 2019

- An interprofessional team of UT Health students collectively developed a one hour lesson plan to be delivered to an after-school setting for 5th graders. I, along with other students from different science backgrounds, delivered a lesson plan focused on diabetes and obesity to around fifty 5th grade students attending Basis San Antonio Primary School at the Medical Campus.

Think Science and Discovery Day at the Tobin Center: UT Health San Antonio partnered with Texas Public Radio and the Tobin Center for a Think Science and Discovery Day at the Tobin Center for the performing arts, 2019

- I volunteered to showcase scientific innovations and discoveries through interactive exhibits and booths prior to the Science Friday – Live! show. Activities included DNA candy models to explain the DNA structure to the youth of San Antonio. Directions on building a powerful microscope and creating brain hats. Activities offered both kids and adults a chance to experience science in a very hands-on approach.

Thesis Supervisor of Master's thesis at University of Mumbai, India

- Mansi Gaonkar, MS student, University of Mumbai, 2011-2013 Co-supervisor, thesis titled, 'Biological and Chemical synthesis of gold nanoparticles and their applications'.
- Manisha Atos, MS student, University of Mumbai, 2011-2013 Supervisor, thesis titled, 'Production and extraction of violacein pigment from *Chromobacterium violaceum* and its applications'.
- Supriya Karbele, MS student, University of Mumbai, 2011-2013 Supervisor, thesis titled, 'Production of pigment from *Pseudomonas aeruginosa* NCIM 2863 its application.'

Honors and Awards

First place poster presentation award at Annual San Antonio Postdoctoral research forum (SAPRF), 2022

SABER*IRACDA Associate Scholar, UT Health San Antonio, 2021.

Graduate school of Biomedical Sciences (GSBS) Outstanding Student Leadership Award, UT Health San Antonio, 2021

American Association of Immunologists (AAI) Trainee abstract award, 2020

Microbiology, Immunology and Molecular Genetics (MIMG) travel award, UT Health San Antonio, 2020

Graduate school of Biomedical Sciences (GSBS) travel award, UT Health San Antonio, 2020

Microbiology, Immunology and Molecular Genetics (MIMG) travel award, UT Health San Antonio, 2019

Outstanding poster presentation award at Vaccine conference, San Antonio, 2018

CSIR-UGC NET-LS, India, National rank 31 (a highly competitive exam with passing ratio of 3%-4% all over the country), 2011.

Non-Peer Reviewed Publications/ Science Communication

Semwal, M.K. (2021) enventure.org/scicom. Obesity Treatments: Current and Future.

Semwal, M.K. (2020) Opposition to vaccines: a global catastrophe. The Pipette Gazette.

Semwal, M.K. (2020) As COVID-19 unfolds: What we know and where are we headed? The Pipette Gazette

Semwal, M.K. (2020) 7 Commonly asked questions about COVID-19. The Pipette Gazette.

Brown A. and **Semwal, M.K.** (2020) Why Age May Just Be A Number: The Epigenetics of Aging. The Pipette Gazette.

Publications Reviewed

Reviewed over 50 publications in following journals:

1. Journal of Immunology Research
2. Canadian Journal of Infectious Diseases and Medical Microbiology
3. European Journal of Cancer Care
4. Disease markers
5. Transboundary and Emerging Diseases
6. Infectious Disease Reports

Professional and Scientific Presentations/Abstracts

Poster Presentations:

Semwal, M.K., Baeuerle, E., Zhang, N., Liang, H., Ganapathy, V., Natapol Sathavarodom, N., Fernandez, R., Wang, C., Dong, Q., Yang, Z., Kostic, A., Espinoza, S., and Musi, N. Sevelamer Improves Insulin Sensitivity in Obese Human Subjects. Presented at the 2024 Bi-National Obesity and Metabolic Symposium, April 2024.

Semwal, M.K., Baeuerle, E., Zhang, N., Liang, H., Ganapathy, V., Natapol Sathavarodom, N., Fernandez, R., Wang, C., Dong, Q., Yang, Z., Kostic, A., Espinoza, S., and Musi, N. Sevelamer Improves Insulin Sensitivity in Obese Human Subjects. Presented at the 27th Annual Medical Research Day conference March 2024.

Semwal, M.K., Baeuerle, E., Zhang, N., Liang, H., Ganapathy, V., Natapol Sathavarodom, N., Fernandez, R., Wang, C., Dong, Q., Yang, Z., Kostic, A., Espinoza, S., and Musi, N. Sevelamer Improves Insulin Sensitivity in Obese Human Subjects. Presented at the IRACDA 2023 Conference, June 2023.

Semwal, M.K., Baeuerle, E., Zhang, N., Liang, H., Ganapathy, V., Natapol Sathavarodom, N., Fernandez, R., Wang, C., Dong, Q., Yang, Z., Kostic, A., Espinoza, S., and Musi, N. Sevelamer Improves Insulin Sensitivity in Obese Human Subjects. Presented at the 13th Annual Frontiers of Translational Science Research Day conference, April 2023.

Semwal, M.K., Baeuerle, E., Zhang, N., Liang, H., Ganapathy, V., Natapol Sathavarodom, N., Fernandez, R., Wang, C., Dong, Q., Yang, Z., Kostic, A., Espinoza, S., and Musi, N. Sevelamer Improves Insulin Sensitivity in Obese Human Subjects. Presented at the 26th Annual Medical Research Day conference March 2023.

Semwal, M.K., Hester, A.K., Cepeda, S., Xiao, Y., Venables, Udeaja, C., T., Griffith, A.V. Redox regulation of stromal cell function in thymus. Presented at the San Antonio Postdoctoral Research Forum conference Sep 2022

Semwal, M.K., Hester, A.K., Cepeda, S., Xiao, Y., Venables, Udeaja, C., T., Griffith, A.V. Redox regulation of stromal cell function in thymus. Presented at the San Antonio Postdoctoral Research Forum conference Dec 2021.

Semwal, M.K., Liang, H., Baeuerle, E., Musi, N. Methyl Palmitate and sodium undecylenate decrease insulin stimulated glucose uptake in L6 cells. Presented at the 24th Annual Medical Research Day conference Dec 2021.

Semwal, M.K., Hester, A.K., Cepeda, S., Xiao, Y., Venables, Udeaja, C., T., Griffith, A.V. Redox regulation of stromal cell function in thymus. Presented at the American Association of Immunologists (AAI) conference 2021

Semwal, M.K., Hester, A.K., Xiao, Y., Venables, T., Griffith, A.V. Redox regulation of stromal cell function in thymus. Presented at the American Association of Immunologists (AAI) conference 2019.

Semwal, M.K., Hester, A.K., Xiao, Y., Venables, T., Griffith, A.V. Redox regulation of stromal cell function in thymus. Presented at the Vaccine Development Center of San Antonio Conference, 2018.

Semwal, M.K., Hester, A.K., Xiao, Y., Venables, T., Griffith, A.V. Redox regulation of stromal cell function in thymus. Presented at the Microbiology, Immunology and Molecular Genetics Annual retreat, 2017.

Semwal, M.K., Xiao, Y., Venables, T., Griffith, A.V. Redox regulation of stromal cell function in thymus. Presented at the Microbiology, Immunology and Molecular Genetics Annual retreat, 2016.

Semwal, M.K., Xiao, Y., Venables, T., Griffith, A.V. Redox regulation of stromal cell function in thymus. Presented at the Vaccine Development Center of San Antonio Conference, 2016.

Semwal, M.K., Xiao, Y., Venables, T., Griffith, A.V. Redox regulation of stromal cell function in thymus. Presented at the American Association of Immunologists (AAI) conference 2015.

Semwal, M.K., Xiao, Y., Venables, T., Griffith, A.V. Redox regulation of stromal cell function in thymus. Presented at the Microbiology, Immunology and Molecular Genetics Annual retreat, 2015.

Invited Oral Presentations:

Semwal, M.K., Hester, A.K., Xiao, Y., Venables, T., Griffith, A.V. Redox regulation of stromal cell function in thymus. Invited to present at the American Association of Immunologists (AAI) conference 2020 (canceled due to COVID-19).

Semwal, M.K. How to overcome graduate school challenges during COVID-19? Presented at the Mikiten Graduate Symposium, UT Health San Antonio, 2020.

Oral Presentations:

Semwal, M.K., Hester, A.K., Xiao, Y, Venables, T., Griffith, A.V. Redox regulation of autophagy in thymic stromal cell function. Presented at the Vaccine Development Center of San Antonio Conference, 2019

Panel member:

Moderator: Session featuring talks from the abstracts. 2021 Masoro-Barshop conference on aging, “The aging immune system”, UT Health San Antonio, October 2021

Memberships and Professional Associations

Chair for the San Antonio Postdoctoral Research Forum (SAPRF) organizing committee, May 2023-September 2023.

Networking officer at UP (UT Health San Antonio Postdoc Association), 2021-Present

- My roles as the networking officer are to interact with various entities, to organize workshops, scholarly activities, and career discovery opportunities, both inside and outside of UT Health SA to facilitate and promote development of professional networks. I have organized several career talks and work actively with my team to organize social and professional events.
- SAPRF organizing committee 2022.

Graduate student representative for Library Committee, 2019-2021

- My role as a graduate student representative is to serve in a consultative and advisory capacity to the President and Vice President for Division of Academic, Faculty, & Student Affairs (AFSA) and to advise the Sr. Director of Libraries in making recommendations to the President regarding Library practices and procedures.

SACNAS (Society for Advancing Hispanics/Chicanos and Native Americans in Science) 2019-2021

- July 2019-Present: National Liaison, Society for Advancing Hispanics/Chicanos and Native Americans in Science (SACNAS) Chapter at UT Health San Antonio

Mahogany Scholars at UT Health at San Antonio

- July 2019 –Sept 2019: Vice-President, Mahogany Scholars
 - Became interim Vice-President of Mahogany Scholars, the professional student minority association at UT Health, and organized a summer cookout event celebrating Juneteenth, an official Texas state holiday celebrating the end of slavery in Texas. The event was celebrated with a summer cookout where students from all disciplines and professions were invited to network thus providing an interprofessional environment. The cookout was attended by more than 40 students including students from Health Professions, Medical, Dental, Nursing and IBMS, along with undergraduate students from various UT Health SA summer programs.

Founding member and Secretary, Graduate school international club (GSIC)

- July 2017-Sept. 2019:
 - The main objective of founding the GSIC was to make a better transition for the incoming international students and working with Office of international services (OIS) to make the transition better. Our organization hosted four events bringing together students from various cultural and diverse backgrounds and learn about each other's cultures.

Member of Woman in Science, Development, Outreach and Mentoring (WISDOM) Organization at UT Health at San Antonio 2017-Present

- Help support women in science by providing community outreach and peer-level support for trainees. To help inspire young women to enter STEM and supporting those who have already chosen a career path in STEM.

National Postdoctoral Association (NPA), 2021-Present

The American Association of Immunologists (AAI), 2016-Present

American Association for the Advancement of Science (AAAS), 2016-Present

Skills and Expertise

Immunological techniques, Mouse work, Flow cytometry, Image flow cytometry, Bone marrow transplantation, Tetramer assays, Microscopy, Molecular Biology techniques, clinical adipose sample, and Single Cell RNA Sequencing.

Community Engagement: Volunteer Activities

Young Women's Leadership Academy, 2024

Judged and awarded science fair projects for elementary school level using a virtual platform

Judge for McNair Scholars Research Symposium, Our Lady of the Lake University, November 2024

Judge for San Antonio Postdoctoral Research Forum (SAPRF), UT Health Science Center, San Antonio, September 2024

Voelker Academy Admissions Committee Interviewer, 2024

- Interview panel for Voelcker Academy applications.

Young Women's Leadership Academy, 2023

- Judged and awarded science fair projects for elementary school level using a virtual platform.

Voelker Academy Admissions Committee Interviewer, 2023

- Interview panel for Voelcker Academy applications.

Alamo Regional Science & Engineering Fair (ARSEF) Judge, 2023

- Judged and awarded science fair projects from elementary to high school level using a virtual platform 'Rocket judge.'

Alamo Junior Academy of Science (AJAS) Judge, 2023

- Judged and awarded science fair projects from elementary to high school level using a virtual platform 'Rocket judge.'

Panelist for "Women in Science Panel" at St. Mary's University, 2022

- Invited as a panelist for Women's History month to talk about my training experience as a women scientist to the undergraduate students.

Alamo Regional Science and Engineering Fair (ARSEF) Judge, 2021

- Judged and awarded science fair projects from elementary to high school level using a virtual platform 'Rocket judge'

Science Fair Judge at John Jay Science & Engineering academy school, San Antonio, 2020 using virtual platform.

Alamo Regional Science and Engineering Fair (ARSEF) Judge, 2020

- Judged and awarded science fair projects from elementary to high school level

Science Fair Judge at the Alamo Regional Academy of Science and Engineering Fair (ARSEF), 2019

Volunteer at the Community Service Learning (CSL) conference, trauma-informed care.

Science Fair Judge at the Harmony Science Academy, San Antonio, 2019.

Science Fair Judge at John Jay Science & Engineering academy school, San Antonio, 2019

Volunteer at Castle Hills Elementary School Career Night, 2019

- Discussed with around 100 kids between the ages of six years old and up the day in the life of a Scientist Encouraged children to pursue a field in science. Explained to children what Scientist do.

Volunteer at the culturally diverse event 'Diwali' organized by the Office of International Services, UT Health San Antonio, 2017-2019.