Stanford

Adel Mutahar

Postdoctoral Scholar, General and Vascular Surgery

Bio

BIO

Dr. Adel Z. I. Mutahar is a postdoctoral researcher in the Department of Surgery at Stanford University, working under the mentorship of Dr. Frederick M. Dirbas. His research focuses on translational breast cancer biology and emerging radiotherapy technologies, with an emphasis on tumor–microenvironment interactions, immuno-oncology, and preclinical therapeutic development. His academic journey spans three countries—beginning in Yemen, advancing through India, and now progressing at Stanford—reflecting his commitment to impactful cancer research and global scientific advancement.

Dr. Mutahar began his career in Yemen, earning his Bachelor's degree in Medical Laboratory Sciences before joining Abs Community College as a faculty member. From 2007–2013, he held several academic leadership roles, including Academic Director, Head of Evaluation, and Assistant Dean of Students, where he modernized curriculum, expanded hands-on diagnostic training, and strengthened laboratory education infrastructure in resource-limited settings. His work contributed to building a more skilled medical diagnostics workforce and improving pathways for laboratory science education.

Awarded a prestigious national merit scholarship, Dr. Mutahar continued his graduate and doctoral training in India, completing his M.S. and Ph.D. in Biotechnology with a focus on triple-negative breast cancer. During his doctoral work, he developed 3D tumor spheroid models and combinatorial therapeutic strategies, demonstrating synergy between anti-angiogenic agents and chemotherapy in TNBC. He further advanced this research by creating an orthotopic murine model to investigate metastatic progression and demonstrated that knockdown of the MTA1 gene in mesenchymal stem cells (MSCs) significantly suppressed TNBC invasion, angiogenesis, and metastatic spread, introducing a promising stromal-targeted therapeutic concept for aggressive breast cancer. This work earned recognition through travel grants, conference presentations, and a Best Poster Award. His scientific adaptability was further demonstrated during the COVID-19 pandemic, when he uncovered a novel interaction between SARS-CoV-2 Spike RBD and VEGF signaling.

At Stanford, his work emphases on FLASH radiotherapy, an ultrahigh-dose-rate modality with the potential to widen the therapeutic window by minimizing normal-tissue toxicity while maintaining tumor control. Working within Dr. Dirbas's translational breast oncology program, Dr. Mutahar employs patient-derived xenografts, orthotopic murine models, spatial transcriptomics, single-cell RNA sequencing, and immune profiling to dissect the biological mechanisms governing treatment response. His research integrates multi-omics analysis to map early and late radiotherapy injury pathways —including senescence, apoptosis and fibrosis. His goal is to develop mechanism-driven radio-immunotherapy strategies and durable FLASH-RT combination regimens that can be translated into clinical trials for breast cancer, improving therapeutic durability, minimizing toxicity, and ultimately enhancing patient outcomes.

Dr. Mutahar's long-term vision is to establish an independent laboratory at the intersection of radiobiology, immuno-oncology, and translational therapeutics. Guided by Dr. Dirbas's mentorship and shaped by multidisciplinary experience across three continents, he aims to develop biologically

informed treatment strategies that eradicate tumors while preserving normal tissue and immune integrity—ultimately improving quality of life and survival for women with aggressive breast cancers.

HONORS AND AWARDS

- Young Investigator Award, San Antonio Breast Cancer Symposium (9-12 December 2025)
- Travel Award - Immune Responses & DNA Repair - Cancer Fields Converging. Florence, Italy, European Association for Cancer Research (EACR) (16-18 March 2023)
- Best Poster Presentation Award, Bangalore Tech Summit organized by Government of Karnataka - India at Bangalore. (16th to 18th November 2022)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Associate Member, American Association of Cancer Research (2020 - present)
- Associate Member and Ambassador, European Association of Cancer Research (2019 - present)
- Postdoctoral Member, American Society for Radiation Oncology (2025 - present)
- Member, Indian Association of Cancer Research (2017 - present)

PROFESSIONAL EDUCATION

- Doctor of Philosophy, University Of Mysore (2023)
- Bachelors in Medical Sciences, Faculty of Medicine and Medical Sciences - Hodeida University - Yemen , Medical Laboratories (2006)
- Master of Science, Bangalore University - India , Biotechnology (2015)
- PhD, University of Mysore, India , Biotechnology (Cancer Biology and Combination Therapies) (2023)

STANFORD ADVISORS

- Frederick Dirbas, Postdoctoral Faculty Sponsor

Publications

PUBLICATIONS

- **Synergistic anti-tumor effects of novel two-domain soluble Fms-like tyrosine kinase-1 and paclitaxel on three-dimensional breast cancer models: implications for targeted therapy.** *Journal of translational medicine*
  Mutahar, A. Z., Dayal, R., Salimath, B. P.
  2025

- **Effectiveness of FLASH vs. Conventional Dose Rate Radiotherapy in a Model of Orthotopic, Murine Breast Cancer.** *Cancers*
  Melemenidis, S., Viswanathan, V., Dutt, S., Kapadia, N., Lau, B., Soto, L. A., Ashraf, M. R., Thakur, B., Mutahar, A. Z., Skinner, L. B., Yu, A. S., Surucu, M., Casey, et al
  2025; 17 (7)

- **In-vitro multicellular 3D-Spheroid model demonstrates the synergistic effect of 2-domain soluble FMS-like Tyrosine Kinase-1 (2d-sFlt-1) for breast cancer targeted therapies**
  Mutahar, A. I.
  AMER ASSOC CANCER RESEARCH.2023

- **Vascular Endothelial Growth Factor Receptor, fms-Like Tyrosine Kinase-1 (Flt-1), as a Novel Binding Partner for SARS-CoV-2 Spike Receptor-Binding Domain.** *Frontiers in immunology*
  Mutahar, A. Z., Devaramani, M., Dayal, R., Saini, D. K., Salimath, P. V., Salimath, B. P.
  2022; 13: 906063