ADAN TANVEER

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SUMMARY

Cancer biologist with two years of hands-on graduate research on patient-derived models of colorectal cancer. Current doctoral research applies computational biology to glioblastoma, studying how tumor-associated macrophages handle iron and where that activity sits inside the tumor. Generates patient-derived organoids directly from primary human tumor tissue, covering the full path from tumor processing and dissociation through long-term organoid culture, and works comfortably with mammalian cell culture under aseptic technique, transfection, and stable line generation. Strong on foundational molecular biology, including PCR and qPCR, gel electrophoresis and SDS-PAGE, bacterial culture and plasmid preparation, and DNA/RNA extraction, purification, and quantification. Characterizes these models with quantitative absorbance- and fluorescence-based assays (ELISA, viability, and proliferation), flow cytometry (cell-cycle, apoptosis, and surface-marker analysis), migration assays, and in vivo PDX and CDX studies, following and adapting protocols carefully throughout. Also pairs bench work with computational and AI tools, including Python, in silico systems-oncology modeling, and multi-omics analysis, to design experiments and interpret data.

EDUCATION

University of Iowa *2024 – Present*
Degree: PhD, Biomedical Science Program (Cancer Biology and Free Radical and Radiation Biology)
Department of Radiation Oncology, Carver College of Medicine
Affiliations: Holden Comprehensive Cancer Center (HCCC); University of Iowa Hospitals and Clinics

University of Iowa *2024 – 2026*
Degree: Master's in Cancer Biology
Thesis: *Investigating the effect of GPx1 and its inhibition on colon cancer progression and response to chemotherapy*
Cancer Biology Fellow (fully funded) | **CGPA:** 4.125/4.0

Lahore University of Management Sciences (LUMS), Pakistan *Bachelor's, Class of 2023*
Major: Biology | **Thesis:** *Autophagy Regulation in Colorectal Cancer*
CGPA: 3.60/4.0 | Graduated with Distinction | Dean's Honor List (7 semesters)

Research Interests: Cancer Biology, Cell Signaling, Cell Death Pathways, Cancer Therapeutics, Precision Medicine, Tumor Microenvironment.

RELEVANT COURSEWORK

Cancer Biology,
Biochemistry,
Genetics & Epigenetics,
Molecular Biology,
Microbiology,
Biostatistics

RESEARCH EXPERIENCE

Graduate Research Assistant – Petronek Lab Iowa City, IA
Department of Radiation Oncology – University of Iowa *2026 – Present*

- Study how immune cells inside and around glioblastoma tumors shape tumor progression, with a focus on macrophages and how the tumor redirects them into a supportive tumor environment.
- Investigate how tumor-associated macrophages handle iron, which influences inflammation, tissue damage, immune suppression, and treatment response.
- Use computational biology and publicly available patient datasets to test whether macrophages in glioblastoma show a specific iron-recycling program, and where that program appears within the tumor.
- Map iron-related patterns across single-cell, bulk, anatomic, and proteomic datasets. Current findings point to a strong iron-recycling signal in tumor-associated macrophages rather than in the cancer cells, and it is most pronounced in regions near dead or dying tumor tissue.

Graduate Research Assistant – Cancer Biology Program Iowa City, IA
Carver College of Medicine – University of Iowa *2024 – 2026*

- Investigated GPx1 (glutathione peroxidase 1) as a mediator of colon cancer progression and chemotherapy resistance using patient-derived organoid models and in vitro cell-based assays.
- Processed and prepared human CRC tumor tissue specimens for downstream molecular and cellular analyses, including sectioning, lysate preparation, and nucleic acid extraction and quantification.
- Cultured and maintained patient-derived colorectal cancer organoids and adherent CRC cell lines under aseptic technique to model drug response and evaluate the effects of GPx1 inhibition on tumor growth and treatment sensitivity.
- Designed, executed, and troubleshot experiments spanning qPCR, protein and immunoassays, flow cytometry, and cell viability/proliferation and migration assays to characterize drug-response phenotypes.

- Performed flow cytometry-based analyses including cell cycle profiling, apoptosis detection (Annexin V/PI), and surface marker phenotyping to evaluate drug response in CRC models.
- Conducted in vivo efficacy studies in patient-derived xenograft (PDX) and cell line–derived xenograft (CDX) mouse models of CRC, including subcutaneous tumor implantation, dosing, caliper-based tumor volume measurements, body weight monitoring, and endpoint tissue harvest and necropsy processing.
- Analyzed experimental datasets and integrated findings with published multi-omics data to identify molecular signatures associated with GPx1-mediated treatment resistance.

Undergraduate Research Lead – Biomedical Informatics Research & Engineering Lab (BIRL) Lahore, Pakistan
Senior Year Research Project – LUMS *2022 – 2023*

- Led a team project investigating pro-survival vs. anti-survival autophagy regulation in colorectal cancer, constructing signaling pathway models informed by primary literature and public gene databases.
- Performed robustness and sensitivity analyses to identify key autophagy regulatory nodes as candidate therapeutic targets in CRC.
- Co-developed TISON (Theatre for in silico Systems Oncology), a web-based platform for multi-scale cancer modeling: designed validation case studies and contributed to the manuscript.

Biostatistics Researcher Lahore, Pakistan
Department of Life Sciences – LUMS *Spring 2023*

- Analyzed serum marker profiles across rheumatoid arthritis and periodontal disease cohorts using regression, cluster analysis, and gene ontology enrichment to identify overlapping immunopathological mechanisms.
- Identified statistically significant differences in serum marker concentrations across clinical groups, contributing to a framework for personalized treatment approaches.

Research Intern – TISON & ATLANTIS Projects Lahore, Pakistan
Biomedical Informatics Research & Engineering Lab (BIRL) – LUMS *2021 – 2022*

- Developed algorithms for cellular circuit modeling within the TISON oncology simulation platform; debugged front-end code and co-authored the platform manuscript.
- Constructed cancer gene interaction networks using TCGA data for HNSCC (1,400+ mutated genes cataloged) and colorectal cancer to support pathway analysis and target identification.

CLINICAL EXPERIENCE

Clinical Shadowing – Colorectal Cancer Care Iowa City, IA
Division of Gastrointestinal Surgery – University of Iowa Hospitals and Clinics *Fall 2025*

- Shadowed Kristina Guyton, MD, Clinical Associate Professor of Surgery, observing colorectal cancer care from presentation through operative management and specimen handling.
- Observed postoperative treatment planning, including the use of next-generation sequencing (NGS) tumor profiling to guide systemic therapy selection.
- Connected the clinical path of a colorectal tumor specimen to its downstream use in patient-derived organoid culture and preclinical drug-response work.

TECHNIQUES

PCR & qPCR
Gel Electrophoresis / SDS-PAGE
Aseptic Technique & Sterile Culture
Mammalian Cell Culture
Flow Cytometry & Cell Sorting
ELISA & Immunoassays
Cell Migration Assays
In Vivo Mouse Models (PDX, CDX)
Plasmid Prep (Miniprep / Isolation)
DNA/RNA Extraction, Purification & Quantification
Transfection & Stable Cell Line Generation
Patient-Derived Organoid Culture
Western Blot Sample Prep
Cell Proliferation / Viability Assays
Human Tissue Processing (CRC Tumors)
Tissue Harvest & Necropsy Processing

COMPUTATIONAL METHODS

Bulk RNA-seq: QC, normalization, DE
Batch Correction
Gene Set Scoring (AddModuleScore, AUCell, UCell)
Over-representation & GO Enrichment
Bulk Deconvolution (CIBERSORTx, xCell, MCP-counter)
Cell-Cell Communication (CellChat, CellPhoneDB)
Survival Analysis (Kaplan-Meier, Cox)
Spatial & Region-resolved Analysis
Proteomics Differential Abundance
Single-cell RNA-seq: QC, integration, clustering
Cell Type Annotation & Marker Identification
GSVA / ssGSEA / GSEA
Gene Signature Construction & Validation
ESTIMATE Tumor Purity
Trajectory / Pseudotime (Monocle3, Slingshot)
WGCNA Co-expression Networks
Multi-omics Integration
Gene Interaction Network Construction

Multiple Testing Correction (FDR) Dimensionality Reduction (PCA, UMAP)

PUBLICATIONS

1. Nasir Z, Sultan MU, Gondal MN, ... **Tanveer A**, ... Chaudhary SU. "TISON: A Web Server for Omics-driven Integrative Cancer Modeling & Simulations towards Personalized Medicine." *Journal of Molecular Biology*, September 2026, article 170025. doi:10.1016/j.jmb.2026.170025
2. **Tanveer A**, Hussain R, Butt RN, Chaudhary SU. "Decoding the Biomolecular Regulation of Switching between Anti-survival and Pro-survival Autophagy in Colorectal Cancer." *In Development.*

HONORS, FELLOWSHIPS AND AWARDS

2025 – 2026	**Cancer Biology Fellowship** – University of Iowa, Carver College of Medicine. Fully funded fellowship (stipend, tuition, fees) awarded for academic excellence and research potential.
Fall 2023	**BIOI Essay Writing Competition** – Secured 1st Place and won Grand Prize of $700, along with Excellence Award Certificate.
2023	**Graduation with Distinction** – Award of Distinction from LUMS due to outstanding CGPA.
2023	**AIEF National AI Championship Finalist** – Distinguished as one of the Top 7 finalists in the highly competitive AIEF 1st National AI Championship.
May 2023	**National Grassroots ICT Research Initiative Grant** – Competitively awarded PKR 85,000 to fund senior thesis research on autophagy regulation in CRC.
Fall 2022	**Diamond Challenge Award** – Overall 3rd place in Social Entrepreneurship Competition at the University of Delaware.
2020 – 2023	**Dean's Honor List** – 7 consecutive semesters on scoring more than 3.60 GPA.

TEACHING EXPERIENCE

Teaching Assistant – Dept. of Life Sciences & Mathematics Lahore, Pakistan
Lahore University of Management Sciences (LUMS) *2021 – 2023*

- Served as TA for 7 courses including Biochemistry, Molecular Biology, Introductory Biology, Scientific Writing & Ethics, and Linear Algebra, supporting 200+ students total.
- Co-organized two "Training the Trainers" workshops (Genetics & DNA Basics) for educators, developing curricula and leading interactive sessions (Aug 2023).

LEADERSHIP EXPERIENCE

Cancer Biology Social Committee Member Iowa City, IA
Carver College of Medicine – University of Iowa *2024 – Present*

- Coordinate social programming and community-building events for the Cancer Biology graduate program, fostering collaboration among students, postdocs, and faculty.
- Organize the annual Cancer Biology retreat, managing logistics, scheduling, and speaker coordination to facilitate scientific exchange and networking.
- Recruit and host invited speakers for departmental seminars, liaising with faculty and external researchers to curate a diverse lineup of talks.

Language Skills: Fluent in English, Urdu; Conversational proficiency in Punjabi
Programming: R, Python, MATLAB, C++, JavaScript
Bioinformatics Packages: Seurat, Scanpy, DESeq2, edgeR, limma, clusterProfiler, fgsea, GSVA, WGCNA, Monocle3, Slingshot, CellChat, CellPhoneDB, Harmony, AUCell, UCell, survival, lifelines
Public Resources: TCGA, CGGA, Ivy GAP, CPTAC, GEO, GTEx, cBioPortal, Human Protein Atlas, MSigDB, Reactome, KEGG, Gene Ontology
Statistics & Figures: SPSS, Minitab, GraphPad Prism, ggplot2, matplotlib, seaborn
Other Tools: Gephi, I-TASSER, SWISS-MODEL, PHYRE2, ChemDraw, TISON, Git, R Markdown, Jupyter, EndNote
Certifications: Writing in the Sciences (Stanford University), CITI IRB-01 Biomedical Human Subjects Research, CITI IACUC Animal Research, Working with Mice in Research (CITI), Biomedical Responsible Conduct of Research (CITI), Understanding Cancer Metastasis (Johns Hopkins University), COVID-19 Contact Tracing (Johns Hopkins University), Introductory Human Physiology (Duke University), Psychological First Aid (Johns Hopkins University)