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TianJin Medical University(TMU), HePin, TianJin - 300070, China

RESEARCH INTEREST

With a strong foundation in both basic medicine and bioinformatics, I specialize in applying bioinformatics techniques to investigate cancer biology, particularly focusing on the roles of genomics and epigenetic modifications in tumor development and progression. I am also interested in tumor immune infiltration and its interaction with the genomic and epigenetic landscape. I am passionate about identifying potential therapeutic targets through integrative bioinformatics analyses, and exploring how genetic and methylation alterations contribute to cancer development and treatment response.

EDUCATION



• Basic Medical Science College, TianJin Medical University

Sep. 2021 - Jun. 2026 (Expected)

Bachelor of Science in Basic Medicine (Chu Hsien-I class)

TianJin, China

- **GPA:** 3.77 / 4.00 (Overall); **RANKING** : 2nd (Third year) / 1st (Overall) out of 22 students;
- **IELTs:** 7.0, C1 (Validated Score, R:8.0, L:7.0, S:6.0, W:6.0);

RESEARCH PROJECTS

• Pan-Cancer Atlas of TCGA ipaQTM (Independent project)

Mar. 2025 - Present

Supervisor: Prof. Yang Yang Supported by YY Lab, TMU;



- Investigated the relationship between DNA methylation and intronic pre-mRNA polyadenylation (IPA) across 23 cancer types using TCGA data.
- Constructed a pan-cancer ipaQTM (intron polyadenylation quantitative trait methylation) map using In-pact and MatrixEQTL, **identifying over 500,000 cis-/trans- associations, Discovered thousands of putative IPA regulators.**
- Investigating the mechanism behind DNA methylation and IPA, including trans effects from genes such as *CDK12*, *BCL2*, and *CPSF1*, and cis effects involving DNA structure and transcription factor (such as *CTCF*) binding. **Uncovered mechanistic links between DNA methylation and RNA polyadenylation, providing a novel regulatory layer in cancer transcriptomics.**

• Glycolysis-Related Subtypes in Hepatocellular Carcinoma (Independent project)

Mar. 2025 - Present

Supervisor: Prof. Yongmei Li Supported by TMU Yongmei Li Lab;



- Identified key glycolysis-related genes (e.g., *SMG1*, *SRRM2*, *STAG1*) strongly associated with HCC progression through multi-omics integration (RNA-seq, mutation, methylation).
- Constructed a robust glycolytic gene map via PCA and CatBoost-based feature selection from 30 candidate genes. **Developed an NMF-based molecular subtyping model validated against clinical and cellular data, providing diagnostic value for HCC.**
- Explored associations between glycolysis levels and immune infiltration patterns in different HCC subtypes.

• Comprehensive Benchmark of DNN-Based pMHC Predictors (Independent project)

Sep. 2024 - Jan. 2025

Supervisor: Prof. Yang Yang Supported by TMU YY Lab;





- Benchmarked 17 state-of-the-art DNN-based tools for HLA-I peptide binding prediction using a **self-curated dataset of 290,000+ peptides across 44 alleles. Assessed model accuracy, robustness, and interpretability; incorporated SHAP and LIME to reveal internal mechanisms and feature contributions.**
- Found self-attention models (STMHCpan, BigMHC) achieved best overall performance, while capsule-based CapsNet-MHC_AN showed strong generalizability. Demonstrated that models trained on eluted ligand data outperform those using binding affinity data; ensemble strategies further improved reliability.
- Provided actionable guidelines for model selection, data integration, and the design of interpretable, clinically useful immunoinformatics tools.

• The role of HADH Isoform 3 in Endometrial Cancer (Independent project)


Mar. 2023 - Aug. 2024

Supervisor: Prof. Yongmei Li Supported by TMU UROP Fund (1,000 RMB, 10 people in Basic Medicine College);



- **First identified the link between the fatty acid metabolism gene *HADH* and endometrial cancer (EC)** using RNA-seq, genomics, and metabolomics data analysis.
- Discovered that *HADH* isoform 3 is downregulated in EC through *DDX3X* suppression, leading to activation of the *MEK-ERK* signaling pathway and promotion of malignant EC phenotypes.
- Demonstrated the therapeutic potential of *HADH* as a biomarker for EC, and its role in tumor infiltration and microenvironment construction.
- Provided insights for improved EC diagnosis, treatment, and prognosis monitoring by mapping the complete pathway of *HADH-DDX3X-MEK/ERK* interaction.
- **The role of Raptor in Post-Ischemic Angiogenesis (Collaborative project)** Apr. 2022 - Aug. 2023
 Supervisor: *Prof. Ding Ai* Supported by TMUIUROP Fund (20,000 RMB, 20 people in Tianjin Medical University); 
- Peripheral artery disease (PAD) is characterized by arterial narrowing/occlusion leading to ischemia, often progressing to ulcers, gangrene, or limb amputation without timely revascularization. We investigated the role of **Raptor**, a core component of the mTORC1 complex, in post-ischemic angiogenesis using both in vivo and in vitro models.
- Explored the contribution of mTORC1 signaling in vascular regeneration, providing novel insights into the molecular regulation of ischemia-induced angiogenesis. Our findings could offer new therapeutic strategies for PAD by targeting the Raptor/mTORC1 pathway to enhance revascularization and tissue recovery.
- **The role of Annexin A2 in Hepatocarcinogenesis (Collaborative project)** Apr. 2022 - Aug. 2023
 Supervisor: *Prof. Chunjiang Wang* Supported by TMUIUROP Fund (10,000 RMB, 40 students); 
- Investigated the differential roles of *ANXA2* in normal liver regeneration and hepatocellular carcinoma (HCC) development. We identified that *ANXA2* upregulates cholesterol biosynthesis, enhancing hepatocyte proliferation via increased intracellular cholesterol.
- Combined transcriptomic and metabolomic approaches to explore how *ANXA2*-mediated cholesterol regulation contributes to HCC progression. The findings suggest *ANXA2* as a potential dual-function target to simultaneously suppress HCC and promote normal liver regeneration after partial hepatectomy.

PUBLICATIONS

A=RESEARCH ARTICLE, R=REVIEW, P=PUBLICATION, S=IN SUBMISSION 

- [AP.1] Guojia Wu, et al. (2024). **Diagnostic sensitivity of immune-inflammatory cell proportion in early diagnosis of endometrial cancer.** publication in *Clinical Surgical Oncology*.
- [AS.1] Guojia Wu, et al. (2025). **Comprehensive evaluation and interpretative insights of peptide-HLA binding prediction tools using explainable artificial intelligence.** Manuscript submitted for publication in *BioArxiv*.
- [AS.2] Wei Li, Guojia Wu, et al. (2025). **A bibliometric analysis of immunotherapy in glioblastoma.** Manuscript under review.
- [RP.1] Guojia Wu, et al. (2024). **progress of the effect of hydroxyacyl-coenzyme A dehydrogenase in cancer development and its mechanism.** publication in *Basic & Clinical Medicine*.

ACADEMIC SKILLS

- **Programming Languages:** Experienced in R, Python, html and Shell; adaptively learning languages and tools based on project requirements.
- **Wet Lab Techniques:** Western blotting, DNA electrophoresis, plasmid construction and extraction, PCR, cell culture, migration and invasion assays, CCK-8 assay, tumor formation in mice, immunohistochemistry, etc.
- **Bioinformatics Skills:** RNA-seq analysis, database construction, sequence alignment, methylation and mutation analysis, CNV detection, gene enrichment and survival analysis, tumor subtyping, PPI network analysis, immune cell infiltration, Seurat-based single-cell analysis, QTL mapping, XAI techniques (SHAP, LIME) etc.
- **Research Skills:** Familiar with operating system (Windows 7, 8, 10; Linux CentOS, mint, ubuntu); Proficient in visualization tools including PowerPoint, Photoshop, and Adobe Illustrator; skilled in LaTeX, Word, and Excel for academic writing and data processing; experienced in using EndNote for reference management with strong literature search and data organization abilities.

HONORS AND SCHOLARSHIP

- **TianJin Medical University Scholarship – Merit Student** 2021 - 2022
TianJin Medical University [🌐]
 - Ranked in the top 1% of students in TianJin Medical University.
- **TianJin Medical University Scholarship – First Prize** 2022 - 2023
TianJin Medical University [🌐]
 - Ranked in the top 5% of students in TianJin Medical University.
- **TianJin Medical University Scholarship – First Prize** 2023 - 2024
TianJin Medical University [🌐]
 - Ranked in the top 5% of students in TianJin Medical University.

LEADERSHIP, SOCIAL ENGAGEMENT, AND OTHER ACHIEVEMENTS

- **Teaching Assistant in Pathogenic Organisms** Apr. 2023- Jun. 2023
TianJin Medical University, College of Basic Medicine in association with Prof. Yongmei Li
- **Executive Member, Basic Medicine Student Association** Sep. 2021 - Jun. 2025
College of Basic Medicine, TianJin Medical University [🌐]
 - Executed a wide range of volunteer programs within the College of Life Sciences, including social practice, community outreach, and campus-wide events such as the university sports meeting and services for the visually impaired.
 - Led the recruitment and training of new volunteers, and designed engaging volunteer initiatives to enhance student union participation in public service.
- **Third Prize, International Forum on Basic Medical Sciences** Aug. 2024
National Demonstration Center for Experimental Education [🌐]
 - Led Tianjin Medical University's first participation in the Belt and Road International Track; responsible for experimental design, and delivered the entire presentation and defense in English as team leader.
- **Third Prize in the Chinese Mathematics Competitions** Dec. 2023
Chinese Mathematical Society [🌐]
- **Third prize, TianJin Chemistry competition** Oct. 2023
Tianjin Municipal Education Commission [🌐]
- **Third prize, TianJin biology experimental competition** Oct. 2024
Tianjin Municipal Education Commission [🌐]
- **Over 10 awards, Internet Innovation and Entrepreneurship Competition** 2022 - 2024
Ministry of Education of the People's Republic of China [🌐]
- **Over 3 awards, Challenge Cup National undergraduate entrepreneurship plan competition** 2023 - 2024
Ministry of Education of the People's Republic of China [🌐]
- **Over 3 awards, Tianjin medical university TMUSPIP** 2023 - 2024
TianJin Medical University [🌐]
 - Participated in TMUSPIP, Tianjin Medical University's social practice initiative, for three consecutive years as a project leader or core team member; each year successfully secured university-level funding and completed the project with approved final reports.