

Te-An (Hansen) Lee, MSc, MLS (ASCPⁱ) CM

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Research Interests

T Cell Biology: Characterizing tumor-infiltrating T cells and developing engineered T cell therapies for solid tumors.

Cancer Immunology: Investigating immune-cancer interactions in the tumor microenvironment.

Immunotherapy: Studying molecular mechanisms that regulate immune checkpoints and resistance to checkpoint inhibitors.

Education

National Taiwan University (NTU) (Sep. 2022–Jun. 2024)

Master of Science in Graduate Institute of Microbiology (GPA: 4.24/4.30)

Award: 1st place in the Master's Student Progress Presentation

Master's Thesis: To investigate the effect of radiotherapy on adoptive T cell therapy for hepatocellular carcinoma

National Yang-Ming Chiao-Tung University (NYCU) (Sep. 2018–Jun. 2022)

Bachelor of Science in Department of Biotechnology and Laboratory Science in Medicine (GPA: 4.16/4.30)

Dean's List Awards: Fall 2019, spring 2020, fall 2021, fall 2022

Independent Study: To study how influenza A virus regulates host protein interactions

Research Experience

Research Associate, Advisor: Chia-Wei Li, PhD (Aug. 2024–present)

Institute of Biomedical Science, Academia Sinica

- Investigated the type I interferon released by the triple-negative breast cancer (TNBC)-intrinsic cGAS-STING pathway after the STING agonist enhanced the glycosylated PD-L1 expression, which serves as a CAR target and benefits the anti-glycosylated CAR-T treatment. The results were synthesized for the first-author research article titled “cGAS/STING-driven Type I interferon potentiates CAR-T therapy against IFN- γ -induced glycosylated PD-L1 in triple-negative breast cancer” (manuscript under preparation).
- Perused the literature, wrote the original draft, designed the figures, and published the first-author review article entitled “Regulation of PD-L1 glycosylation and advances in cancer immunotherapy” in the journal *Cancer Letters*.

Graduate (Master) Student Researcher, Advisor: Hung-Chih Yang, MD, PhD (Sep. 2022–Jul. 2024)

Graduate Institute of Microbiology, College of Medicine, NTU

- Established a platform to combine radiotherapy and adoptive T cell therapy in a spontaneous hepatocellular carcinoma mouse model. The results were organized and presented in a master's thesis entitled “To investigate the effect of radiotherapy on adoptive T cell therapy for hepatocellular carcinoma.” This work was awarded 1st place in the Master's Student Progress Presentation.

Undergraduate Student Researcher, Advisor: Chia-Wei Li, PhD (Sep. 2020–Aug. 2022)

Institute of Biomedical Science, Academia Sinica

- Searched the literature, wrote the original draft, designed the figures, and published the first-author review article titled “Post-translational modification of PD-1: Potential pathways for cancer immunotherapy” in *Cancer Research*.

- Investigated the DNA damage signaling and cancer cell death pathways triggered by anti-glycosylated PD-L1-CAR-T during the elimination of TNBC.

Summer Intern, Advisor: Chia-Wei Li, PhD (Jul. 2020–Aug. 2020)

Institute of Biomedical Science, Academia Sinica

- Cloned the glycan-site-mutated spike protein from SARS-CoV-2 and packaged the pseudotyped SARS-CoV-2 to validate infectivity. The results were organized and presented on a poster titled “The role of site-specific N-linked glycosylation on spike is critical for SARS-CoV-2.”

Undergraduate Student Researcher, Advisor: Yeou-Guang Tsay, MD, PhD (Sep. 2019–Mar. 2021)

Institute of Biochemistry and Molecular Biology, NYCU

- Used two-dimensional difference gel electrophoresis (2D-DIGE) and mass spectrometry proteomic analysis to study protein–protein interactions after influenza A virus infection. The proposal of this study was accepted and funded NTD 48,000 (USD 1,600) by the College Student Research Scholarship of the National Science and Technology Council of Taiwan.

Peer-Reviewed Publications

1. Lee, T. A., Tsai, E. Y., Liu, S. H., Chou, W. C., Hsu Hung, S. D., Chang, C. Y., Chao, C. H., Yamaguchi, H., Lai, Y. J., Chen, H. L., & Li, C. W. (2025). Regulation of PD-L1 glycosylation and advances in cancer immunotherapy. *Cancer Letters*, 612, 217498. <https://doi.org/10.1016/j.canlet.2025.217498>
2. Lee, T. A., Tsai, E. Y., Liu, S. H., Hsu Hung, S. D., Chang, S. J., Chao, C. H., Lai, Y. J., Yamaguchi, H., & Li, C. W. (2024). Post-translational modification of PD-1: Potential pathways for cancer immunotherapy. *Cancer Research*, 84(6), 800–807. <https://doi.org/10.1158/0008-5472.CAN-23-2664>
3. Lai, Y. J., Liu, S. H., Manachevakul, S., Lee, T. A., Kuo, C. T., & Bello, D. (2023). Biomarkers in long COVID-19: A systematic review. *Frontiers in Medicine*, 10, 1085988. <https://doi.org/10.3389/fmed.2023.1085988>
4. Huang, H. C., Wang, S. H., Fang, G. C., Chou, W. C., Liao, C. C., Sun, C. P., Jan, J. T., Ma, H. H., Ko, H. Y., Ko, Y. A., Chiang, M. T., Liang, J. J., Kuo, C. T., Lee, T. A., Morales-Scheihing, D., Shen, C. Y., Chen, ... Li, C. W. (2023). Upregulation of PD-L1 by SARS-CoV-2 promotes immune evasion. *Journal of Medical Virology*, 95(2), e28478. <https://doi.org/10.1002/jmv.28478>
5. Wang, S. H., Chou, W. C., Huang, H. C., Lee, T. A., Hsiao, T. C., Wang, L. H., Huang, K. B., Kuo, C. T., ... Hung, M. C., & Li, C. W. (2022). Deglycosylation of SLAMF7 in breast cancers enhances phagocytosis. *American Journal of Cancer Research*, 12(10), 4721–4736. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9641385/>
6. Lee, T. A., Wang, S. H., Kuo, C. T., Li, C. W., McCullough, L. D., Bello, D., & Lai, Y. J. (2022). Prognostic serum biomarkers in cancer patients with COVID-19: A systematic review. *Translational Oncology*, 21, 101443. <https://doi.org/10.1016/j.tranon.2022.101443>
7. Huang, H. C., Lai, Y. J., Liao, C. C., Yang, W. F., Huang, K. B., Lee, I. J., Chou, W. C., Wang, S. H., Wang, L. H., Hsu, J. M., Sun, C. P., Kuo, C. T., Wang, J., Hsiao, T. C., Yang, P. J., Lee, T. A., Huang, W., Li, F. A., Shen, C. Y., Lin, Y. L., ... Li, C. W. (2021). Targeting conserved N-glycosylation blocks SARS-CoV-2 variant infection in vitro. *EBioMedicine*, 74, 103712. <https://doi.org/10.1016/j.ebiom.2021.103712>
8. Huang, H. C., Liao, C. C., Wang, S. H., Lee, I. J., Lee, T. A., Hsu, J. M., Kuo, C. T., Wang, J., Hsieh, W. C., Chang, S. J., Chen, S. Y., Tao, M. H., Lin, Y. L., Lai, Y. J., & Li, C. W. (2021). Hyperglycosylated spike of SARS-CoV-2 gamma variant induces breast cancer metastasis. *American Journal of Cancer Research*, 11(10), 4994–5005. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8569360/>

9. Lai, Y. J., Chao, C. H., Liao, C. C., **Lee, T. A.**, Hsu, J. M., Chou, W. C., Wang, J., Huang, H. C., Chang, S. J., Lin, Y. L., & Li, C. W. (2021). Epithelial-mesenchymal transition induced by SARS-CoV-2 required transcriptional upregulation of Snail. *American Journal of Cancer Research*, 11(5), 2278–2290. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8167694/>

Research Skills

Cell Biology	Cell culture (adherent and suspension cancer cell lines, primary T cells, and CAR-T cells), transient transfection, lentivirus packaging and concentration, lentiviral transduction, and electroporation
Molecular Biology	Primer design, polymerase chain reaction, enzyme digestion, molecular cloning (T4 ligation, In-Fusion cloning, and NEBuilder Assembly), heat shock transformation, electroporation transformation, DNA electrophoresis, DNA gel extraction, DNA isolation (gDNA and plasmid), RNA isolation, cDNA reverse transcription, reverse transcription quantitative polymerase chain reaction (RT-qPCR), and enzyme-linked immunosorbent assay (ELISA)
Virology	Virus production and infection (influenza A and pseudotyped SARS-CoV-2), plaque assay (influenza A PR8 and pdm09), and RT-qPCR-based viral titration (lentivirus and pseudotyped SARS-CoV-2)
Immunology	Immunophenotyping by flow cytometry (6-color FACSVerse, 11-color Attune NxT, 14-color LSR Fortessa, and 17-color LSRII), immunohistochemistry, immunofluorescence assay (LSM700 confocal imaging), peripheral blood mononuclear cell (PBMC) isolation, T cell isolation (human PBMC, tumor, or mouse spleen), T cell activation, and CAR-T cell killing assay (lactate dehydrogenase, cell counting kit-8, and flow cytometry)
Biochemistry	Protein extraction (radioimmunoprecipitation assay and urea lysis buffer), protein quantification (Bradford and BCA assays), western blot, methanol-chloroform protein precipitation, and 2D-DIGE (isoelectric focusing + SDS-PAGE)
Animal Techniques	Mice restraint, subcutaneous/intraperitoneal/tail vein injection, blood collection (cheek and heart), mice perfusion, immune cells isolation and analysis (tumor, lung, liver, lymph node, and spleen), cancer cell line inoculation (Matrigel), and hydrodynamic tail vein injection
Bioinformatics	(Software) RStudio (Webpage) TIMER2.0, UCSC Xena, Gene Expression Profiling Interactive Analysis 2, UALCAN, STRING, Uniport, and BioGPS
Applications	Microsoft Word, Excel, PowerPoint, ImageJ, EndNote v21.3.0, Affinity Designer 2 v2.5.5, FlowJo v10.9.0, SnapGene v8.0.2, PRISM v10.3.1, CytoBank, Imaris v10.2.0, and Zen Blue

Honors and Awards

2025	3 rd JCA-AACR Precision Cancer Medicine International Conference Poster Travel Award
2023 Fall	1 st place in the Master's Students Progress Presentation
2021 Fall	Dean's List Award
2020 Fall	Dean's List Award
2020 Spring	Dean's List Award
2019 Fall	Dean's List Award
2021	Taiwan Society of Laboratory Medicine Academic Excellent Scholarship (1 st place graduation)
2021	Zhu-Shun Yi He-Qin Academic Excellence Scholarship (recommended by the college dean)

2020	College Student Research Scholarship, the National Science and Technology Council
2019	Ping-Chin Fan Parasitology Excellence Scholarship (recommended by a parasitology professor)

Certificates

2025	Learn Prompting, Introduction to Generative AI, <i>Certificate of Completion</i>
2023	ASCP Board of Certification for International Medical Laboratory Scientists (MLS)
2022	Senior Professional and Technical Examinations for Medical Technologists (Taiwan)
2020	Harvard Medical School, Online Learning-Biochemistry, <i>Certificate of Achievement</i>
2020	Harvard Medical School, Online Learning-Genetics, <i>Certificate of Achievement</i>
2020	IBMS Summer Internship Program, <i>Certificate of Participation</i>