Xinyu (Cynthia) Tang

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EDUCATION

Doctor of Philosophy in **Nutritional Biology** Expected: June 2024
University of California, Davis
Advisor**:** Dr. Angela Zivkovic
Dissertation: Glycosylation Alterations in Alzheimer's Disease

Master of Science in **Epigenetic Nutrition** June 2018
University of Illinois, Urbana-Champaign
Advisor**:** Dr. Hong Chen
Thesis: Epigenetic regulation of genes related to lipid metabolism by microRNA in mice fed high fat diet

Bachler of Engineering in **Food Science & Engineering** June 2017
Zhejiang University

RESEARCH EXPERIENCE

Graduate Researcher April 2020 - Present
Department of Nutrition, University of California, Davis

- Investigated glycosylation changes in postmortem brains of Alzheimer's individuals through a comprehensive analysis of transcriptome and glycome data, revealing novel insights into the glycosylation patterns associated with Alzheimer's Disease.
- Identified potential transcription factors governing glycosyltransferases by employing innovative TF binding motif enrichment analysis.
- Uncovered nutrient-stimulated transcription factors influencing glycosyltransferase expression, contributing to a deeper understanding of regulatory mechanisms in glycosylation processes.
- Revealed distinct impacts of AβO and LPS on N-glycan patterns on human iPSC microglia from N-glycans detected on human iPSC microglia by optimizing the data analysis strategy of glycomic data.
- Highlighted the consistency between the expression of glycosyltransferases and alterations in glycan structures by integrating the glycomic and transcriptome data.

- Identified potential serum glycan biomarkers for Alzheimer's Disease through a systematic analysis of glycosylation panels, contributing to the development of potential diagnostic tools for Alzheimer's Disease using serum glycan signatures.
- Highlighted the importance of ethnicity as a variable contributing to variability in glycan profiles using various linear regression models, emphasizing the need for tailored and potentially ethnicity-specific approaches in the development of glycan-based diagnostic tools for Alzheimer's disease.
- Explored the lipid composition of the separated plasma fractions using semi-quantitative LC-MS/MS-based lipidomics which quantifies over 600 lipid species across various lipid classes.
- Developed a robust lipidome processing pipeline to accurately quantify the lipid composition within distinct lipoprotein fractions.
- Implemented and enhanced the YOLO (You Only Look Once) object detection system as a replacement for the existing computational tool in the recognition and analysis of Transmission Electron Microscopy (TEM) images, achieving an accuracy rate of 96% on the validation dataset.
- Performed statistical analysis on metabolome and metagenomic data from a crossover clinical study to reveal the health consequences of prebiotic supplements on gut microbiota and metabolism.

Graduate Researcher September 2016 –
Department of Nutrition, University of Illinois at Urbana-Champaign May 2018

- Investigated the impact of a high-fat diet on the epigenetic regulation of lipid metabolism and the amino acid response pathway in liver and adipose tissues using qPCR, western blot, and ChIP technology.
- Designed and executed projects investigating the epigenetic regulation of critical genes in lipid metabolism by microRNA in mouse adipose tissue.
- Reviewed and enhanced the protocol for protein immunoblotting in the laboratory, optimizing experimental procedures and ensuring the accuracy and reliability of protein analysis.
- Mentored and trained undergraduate students in a project focused on the alteration of lipid metabolism in adipose tissue under a high-fat diet.

TEACHING EXPERIENCE

Teaching Assistant September - Present
Department of Nutrition, University of California, Davis

- Prepared the essential experiments for the laboratory class and guided a class of 20 students with the professor in executing various experiments, including q-PCR and western blot.

- Collaborated with the professor and fellow teaching assistants to manage a course with more than 1000 students each quarter.
- Conducted in-person exam review sessions for over 300 students, providing guidance to study for the exam.
- Orchestrated the Jeopardy Game for more than 200 students across 4-6 sections, facilitating an engaging and interactive review session to reinforce lecture material.

PUBLICATION

1. **Tang X**, Tena J, Di Lucente J, Maezawa I, Harvey DJ, Jin L-W, Lebrilla CB, Zivkovic AM (2023) Transcriptomic and glycomic analyses highlight pathway-specific glycosylation alterations unique to Alzheimer's disease. Sci Rep 13:7816
2. Jin L-W, Di Lucente J, Ruiz Mendiola U, **Tang X**, Zivkovic AM, Lebrilla CB, Maezawa I (2023) The role of FUT8-catalyzed core fucosylation in Alzheimer's amyloid-β oligomer-induced activation of human microglia. Glia 71:1346–1359
3. Hong B V, Agus JK, **Tang X**, Zheng JJ, Romo EZ, Lei S, Zivkovic AM (2023) Precision Nutrition and Cardiovascular Disease Risk Reduction: The Promise of High-Density Lipoproteins. Curr Atheroscler Rep 25:663–677
4. Hong B V, Rhodes CH, Agus JK, **Tang X**, Zhu C, Zheng JJ, Zivkovic AM (2023) A single 36-h water-only fast vastly remodels the plasma lipidome. Front Cardiovasc Med 10
5. Hong B V, Zheng JJ, Romo EZ, Agus JK, **Tang X**, Arnold CD, Adu-Afarwuah S, Lartey A, Okronipa H, Dewey KG, others (2023) Seasonal factors are associated with activities of enzymes involved in high-density lipoprotein metabolism among pregnant women in Ghana. Curr Dev Nutr 102041
6. Rhodes CH, Zhu C, Agus J, **Tang X**, Li Q, Engebrecht J, Zivkovic AM (2023) Human fasting modulates macrophage function and upregulates multiple bioactive metabolites that extend lifespan in Caenorhabditis elegans: a pilot clinical study. Am J Clin Nutr 117:286–297
7. Tena J*, **Tang X***, Zhou Q, Harvey D, Barajas-Mendoza M, Jin L-W, Maezawa I, Zivkovic AM, Lebrilla CB (2022) Glycosylation alterations in serum of Alzheimer's disease patients show widespread changes in N-glycosylation of proteins related to immune function, inflammation, and lipoprotein metabolism. Alzheimer's Dement Diagnosis, Assess Dis Monit 14:e12309
8. **Tang X,** Wong M, Tena J, Zhu C, Rhodes C, Zhou Q, Vinjamuri A, Oloumi A, Boddu S, Luxardi G, others (2022) Quantitative glycoproteomics of high-density lipoproteins. RSC Adv 12:18450–18456
9. Hong B V, Zheng J, Agus JK, **Tang X**, Lebrilla CB, Jin LW, Maezawa I, Erickson K, Harvey DJ, DeCarli CS, others (2022) High-Density Lipoprotein Changes in Alzheimer's Disease Are APOE Genotype-Specific. Biomedicines 10:1495
10. Kang JW, **Tang X**, Walton CJ, Brown MJ, Brewer RA, Maddela RL, Zheng JJ, Agus JK, Zivkovic AM (2022) Multi-Omic Analyses Reveal Bifidogenic Effect and Metabolomic

Shifts in Healthy Human Cohort Supplemented With a Prebiotic Dietary Fiber Blend. Front Nutr 9:908534
11. Zheng JJ, Agus JK, Hong B V., **Tang X,** Rhodes CH, Houts HE, Zhu C, Kang JW, Wong M, Xie Y, Lebrilla CB, Mallick E, Witwer KW, Zivkovic AM (2021) Isolation of HDL by sequential flotation ultracentrifugation followed by size exclusion chromatography reveals size-based enrichment of HDL-associated proteins. Sci Rep 11. doi: 10.1038/s41598-021-95451-3
12. Hernández-Saavedra D, Moody L, **Tang X**, Goldberg ZJ, Wang AP, Chen H, Pan Y-X (2021) Caloric restriction following early-life high fat-diet feeding represses skeletal muscle TNF in male rats. J Nutr Biochem 91:108598
13. Zhu C, Sawrey-Kubicek L, Bardagjy AS, Houts H, **Tang X**, Sacchi R, Randolph JM, Steinberg FM, Zivkovic AM (2020) Whole egg consumption increases plasma choline and betaine without affecting TMAO levels or gut microbiome in overweight postmenopausal women. Nutr Res 78:36–41
14. Ma L, Xu GB, **Tang X**, Zhang C, Zhao W, Wang J, Chen H (2020) Anti-cancer potential of polysaccharide extracted from hawthorn (Crataegus.) on human colon cancer cell line HCT116 via cell cycle arrest and apoptosis. J Funct Foods 64:103677

PRESENTATION

Tang X, Lebrilla CB, Jin L-W, Maezawa I, Harvey DJ, Zivkovic AM "Distinct glycosylation changes in Alzheimer's Aβ oligomer- and lipopolysaccharide-activated human microglia" (poster) AD/PD 2024

Tang X, Lebrilla CB, Jin L-W, Maezawa I, Harvey DJ, Zivkovic AM "Unique N-glycosylation signatures in Aβ oligomer- and lipopolysaccharide-activated human iPSC-derived microglia" (poster) Graduate Group of Nutritional Biology Symposium 2023

Tang X, Lebrilla CB, Jin L-W, Maezawa I, Harvey DJ, Zivkovic AM "Multi-omics approach reveals disturbances in brain phosphatidylcholine metabolism in Alzheimer's Disease." (poster) Alzheimer's Association International Conference 2023

Tang X, Lebrilla CB, Jin L-W, Maezawa I, Harvey DJ, Zivkovic AM "Brain Glycosylation Alterations are Highly Pathway-Specific and Unique to Alzheimer's Disease" (oral) Graduate Group of Nutritional Biology Symposium 2022

Tang X, Lebrilla CB, Jin L-W, Maezawa I, Harvey DJ, Zivkovic AM "N-glycosylation patterns dramatically changed in brains of AD patients" (poster) Alzheimer's Disease Research Center Symposium 2022

Tang X, Lebrilla CB, Jin L-W, Maezawa I, Harvey DJ, Zivkovic AM "Cell-type deconvolution analysis of RNAseq data reveals cell-specific glycosylation changes in the brains of Alzheimer's Disease patients." (poster) Alzheimer's Association International Conference 2022

Tang X, Lebrilla CB, Jin L-W, Maezawa I, Harvey DJ, Zivkovic AM “Brain-region-specific, glycosylation-related transcriptomic alterations in Alzheimer’s disease.” (poster) Alzheimer's Association International Conference 2021

SKILLS

Programming: R, python, SQL

Data analysis: glycomics, glycoproteomics, transcriptomics, lipidomics, metabolimics, metagenomics

Deep Learning: YOLO, object detection

AWARDS

2023 Mar Family Dissertation Year Fellowship

2023 Carpenter Travel Award

2023 Rucker Family Fellowship Award

2023 Graduate Studies: Travel Awards

2020-2023 Jastro award