BIOGRAPHICAL SKETCH

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NAME: Ma, Qianqian

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE: Postdoc Fellow

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	START DATE MM/YYYY	COMPLETION DATE MM/YYYY	FIELD OF STUDY
China Agricultural University, Beijing, Beijing	BS	09/2006	07/2010	Biological Sciences
Miami University, Oxford, OH	PHD	08/2010	12/2016	Cell, Molecular & Structural Biology
Johns Hopkins University, Baltimore, MD	Postdoctoral Fellow	02/2019	present	Structural Biology, Lipid Biochemistry

A. Personal Statement

My research focuses on protein structure and protein-lipid interaction and how they correlate with each other in biological systems. As a graduate student, I worked on characterization of a protein transport pathway in chloroplasts by using different biochemistry tools as well as using transmission electron microscope to look at the morphology change of mutant chloroplasts in the cellular level. To extend my experience in structural biology, I decided to learn cryoEM, one of the most powerful tools to exam the biological samples with atomic resolution. To make a smooth transition from studying plant biology at cellular level to protein structure at single particle level, I then worked as a research specialist in Dr. Dan Raben lab and focused on protein expression and purification of a human lipid kinase DGKq and prepared sample for cryoEM studies.DGKq is a lipid kinase modulating lipid signal molecules. Increasing evidence has pinpointed its critical roles in neuronal disease. Structural insights of DGKq will greatly benefit the understanding of its catalytic mechanism and further guide drug design. During my postdoc training, I carried on the structural study of DGKq. In collaboration with Dr. Sandra Gabelli, we have optimized DGKq expression from insoluble bacterial system or low yield HEK293 cells to high yield/high purity from Sf9 insect cells. CryoEM studies with high quality DGKq protein reveals the first mammalian DGK structure since they were identified over six decades ago. We are now gaining substantial insight into the architecture and regulation of this dynamic lipid kinase.

1. Ma Q, Srinivasan L, Gabelli SB, Raben DM. Elusive structure of mammalian DGKs. Adv Biol Regul. 2022 Jan;83:100847. PubMed Central PMCID: PMC8858910.
2. Ma Q, Gabelli SB, Raben DM. Diacylglycerol kinases: Relationship to other lipid kinases. Adv Biol Regul. 2019 Jan;71:104-110. PubMed Central PMCID: PMC6347529.

B. Positions and Honors

Positions and Scientific Appointments

2019 - Postdoc Fellow, Department of Biological Chemistry, Johns Hopkins University, Baltimore, MD
2016 - 2019 Research specialist, Department of Biological Chemistry, Johns Hopkins University, Baltimore, MD

Honors

2020	Helmsley Fellowship for CSHL cryoEM course, Helmsley Charitable Trust
2013	ASPB Travel Award, ASPB
2009	Scholarship, Continent Biotech, Beijing, China
2008	Scholarship, Kerry Oils & Grains, Beijing, China
2007	Scholarship for Excellent Student, China Agricultural University

C. Contribution to Science

1. Graduate Career: My graduate research focused on protein transport in chloroplasts. I characterized Hcf106, one of the major components in Tat (Twin Arginine Translocation) pathway. We successfully integrated in vitro expressed Hcf106 into the isolated chloroplasts. Further BN-PAGE analysis allowed us to identify the locations of amino acids in Hcf106 that were critical for interacting with another component, cpTatC. Comprehensive cross-linking experiment further allowed us to map interactions of the transmembrane domain and amphipathic helix region of Hcf106. A novel model for Tat transport was built based on our findings. I also genetically and developmentally characterized how defected Tat pathway affects chloroplast biogenesis and how it affects the plastid-to-nucleus retrograde signaling pathway.

    a. New CP, Ma Q, Dabney-Smith C. Routing of thylakoid lumen proteins by the chloroplast twin arginine transport pathway. Photosynth Res. 2018 Dec;138(3):289-301. PubMed PMID: 30101370.
    b. Ma Q, Fite K, New CP, Dabney-Smith C. Thylakoid-integrated recombinant Hcf106 participates in the chloroplast twin arginine transport system. Plant Direct. 2018 Oct;2(10):e00090. PubMed Central PMCID: PMC6508782.

2. Postdoctoral Career: As a postdoctoral fellow, my research is focused on the structure and function of a lipid kinase, DGKq. DGKq is highly relevant to human disease as knockout of DGKq greatly affect synaptic vesicle recycling in neuron. I have developed and optimized the expression and purification of DGKq from both human suspension cells and insect cells. The purified DGKq demonstrated high kinase activity from in vitro kinase assay. We also performed HDX-MS experiment in collaboration with Dr. John Burke, characterized protein dynamics and illustrated a conformational change when DGKq substrate is present. Initial cryoEM data collection and processing demonstrated the overall architecture of DGKq. Further screening to identify sample with high resolution structure information is undertaking.

    a. Ma Q, Srinivasan L, Gabelli SB, Raben DM. Elusive structure of mammalian DGKs. Adv Biol Regul. 2022 Jan;83:100847. PubMed Central PMCID: PMC8858910.
    b. Ma Q, Gabelli SB, Raben DM. Diacylglycerol kinases: Relationship to other lipid kinases. Adv Biol Regul. 2019 Jan;71:104-110. PubMed Central PMCID: PMC6347529.

D. Scholastic Performance

Scholastic Performance

YEAR	COURSE TITLE	GRADE
	CHINA AGRICULTURAL UNIVERSITY	
	MIAMI UNIVERSITY	

X: Pass for credit/noncredit class