BIOGRAPHICAL SKETCH

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NAME: Tsang, Wai Lok

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

POSITION TITLE: Medical Student, PSTP Research Trainee

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)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Michigan, Ann Arbor	B.S.	05/13	Neuroscience
University of Pittsburgh	M.D. in progress	05/19	Medicine, Physician Scientist Training Program (PSTP)

A. Personal Statement

I am a medical student and fellow in the Physician Scientist Training Program (PSTP) at the University of Pittsburgh School of Medicine. The PSTP is a five year MD program with dedicated research rotations and supplemental curriculum such as professional writing, literature analysis, and weekly journal clubs where students have the opportunity to present papers with guest mentors from the according field of research. During undergraduate studies I studied Neuroscience at University of Michigan, where I also worked as a research assistant in a Molecular and Cellular Biology lab under the guidance of Dr. Haoxing Xu. The focus of the lab was to uncover signaling mechanisms behind lysosomal trafficking in the context of Lysosomal Storage Diseases(LSDs) and Muscular Dystrophy(MD). During my training I became proficient in molecular biology techniques as well as a fund of knowledge in both cellular membrane trafficking and ion channel signaling. My project in the lab provided important evidence for key signaling mediators underlying physiology and pathology of muscle fiber repair, as well as interaction between these mediators. As the lab found increasing strong evidence of a novel lysosomal TRP channel playing key roles in the pathophysiology of LSDs and MD, and possibly many physiological processes, I became increasingly interested in Electrophysiology in the context of Neurological diseases.

As a medical student at University of Pittsburgh I had the opportunity to choose and work at many Neuroscience labs. In concert with the structured curriculum of the PSTP, I worked in Dr. Charleen Chu's lab for my first summer rotation studying Parkinson's Disease pathogenesis. My project involves identifying intermediary steps leading to the pathologic cellular phenotype caused by the *PINK1* mutation disease model. My background with molecular biology techniques and sub-cellular signaling translated well and I established support for the necessity of p-LC3 and ERK activity in causing the pathologic autophagy phenotype.

Under Dr. Thanos Tzounoupoulos's guidance, my current research project seek to establish the role of endogenous Nitric Oxide(NO) and Nitroxyl(HNO) in neurotransmission using novel fluorescent probes. NO, a relatively new neurotransmitter, and HNO are most well known for their vasodilating properties. However, their endogenous transmission mechanisms are unclear due to the difficulty of sensing gaseous molecules. With novel fluorescent probes and electrophysiological methods, I will clarify whether these two signaling molecules can act as an interface between the Nervous system and the Vascular system with in vivo models.

B. Position and Honors

Positions

2013-2014 Undergraduate Researcher, Department of Molecular, Cellular & Developmental Biology
PI: Haoxing Xu, Ph.D.
University of Michigan, Ann Arbor, MI

2014 Medical Student Researcher, Department of Pathology
PI: Charleen T. Chu, Ph.D.
University of Pittsburgh, Pittsburgh, PA

2014-2015 Medical School Applicant Interviewer, University of Pittsburgh School of Medicine

2015 Medical Student Researcher, Department of Otolaryngology
PI: Thanos Tzounopoulos, Ph.D.
University of Pittsburgh, Pittsburgh, PA

Other Experience and Professional Memberships

2012-2013 Chapter founder, Nu Rho Psi Honor Society Chapter at University of Michigan
2014- Member, Phi Kappa Phi
2015- Coordinator, Family Medicine Interest Group, University of Pittsburgh
2015- Founding Member, Interest Group of Neurology, University of Pittsburgh
2015- Vice President of Community Service, Student-Run Panther Clinic, University of Pittsburgh

Honors

2012, 2013 James B. Angell Scholar, University of Michigan
2013 B.S. with Highest Distinction, University of Michigan
2014- Physician Scientist Training Program, University of Pittsburgh School of Medicine

C. Contribution to Science

Defined the role of lysosomal trafficking and TRPML1 lysosomal membrane channel in Muscular dystrophy (Mentor: Dr. Haoxing Xu)

In physiological systems the myotube membrane is regularly damaged through locomotion. Damage rate and repair rate of the membrane hold a fine balance. Muscular dystrophy results when the balance is disrupted either through compromised membrane integrity or impaired repair mechanism. Through mouse models, we found that ML1 knock out mice show pathophysiology consistent with diseases under the muscular dystrophy umbrella. To understand the role of ML1 in membrane repair, we tested the hypothesis that ML1 cooperates with other proteins responsible for membrane repair to reseal the damaged membrane. Immediately after induced membrane damage, we found ML1 colocalizing with two proteins required for membrane repair, namely MG53 and dysferlin, at the damage site. This is the initial paper to report the observation of ML1 causing muscular dystrophy.

My specific contributions to this paper was to test the molecular interactions between ML1, MG53, and dysferlin using Westernblot, to test the structural proteins within damaged membranes, as well as quantify fibrosis of muscles with muscular dystrophy.

Cheng, X., Zhang, X., Gao, Q., Samie, M. A., Azar, M., **Tsang, W. L.**, Dong, L., Sahoo, N., Li, X. Zhuo, Y., Garrity, A. G., Wang, X., Ferrer, M., Dowling, J., Xu, L., Han, R. & Xu, H. (2014). The intracellular Ca2+ channel MCOLN1 is required for sarcolemma repair to prevent muscular dystrophy. *Nature medicine*, *20*(10), 1187-1192.