BIOGRAPHICAL SKETCH

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NAME: Liu, Xinran Nick

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

POSITION TITLE: Director of Center for Cellular & Molecular Imaging, EM/CryoEM Core Facilities

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
Second Medical University of PLA, Shanghai, China	M.D.	06/1985	Medicine
Nagoya University School of Medicine, Japan	Ph.D.	05/1996	Cell Biology
University of California, San Diego	Postdoctoral	03/2000	Pharmacology

A. Personal Statement

I have been managing the electron microscopy (EM) and cryo electron microscopy (cryoEM) core facilities at Yale School of Medicine since December 2011. Up until then, I was the director of neuroscience imaging core facility in University of Texas Southwestern Medical Center at Dallas for 11 years. At Yale EM/CryoEM facility we support campus-wide research projects that require either EM or CryoEM. We study critical details of cellular ultrastructure and high-resolution macromolecular structure utilizing advanced imaging techniques that are unavailable by other methods. Thanks to strong supports from the medical school, we are able to provide scientists with the-state-of-the-art instrument, techniques and necessary user training. Our experienced staff assist users on specimen viewing, imaging and image analysis. Furthermore, we also actively collaborate with investigators on various research projects. My own scientific interest has been to understand the relevance of structural features underlying synaptic function in the central nervous system. Major effort over the past has mainly focused on understanding the dynamic synaptic ultrastructure and its modification in normal and diseased states. The ultimate goal is to reveal the ultrastructural insight from well preserved and near-the-native samples in 3D context. The new information obtained by the new techniques will likely advance our understanding on synaptic function and how neurons communicate.

B. Positions and Honors

Positions and Employment

08/1985-11/1991	Ophthalmologist, Department of Ophthalmology, Shanghai Chang Zheng Hospital (affiliated to Second Medical University of PLA), Shanghai, China
04/2000-11/2011	Assistant Professor, Director of the Neuroscience Imaging Core Facility. Department of Neuroscience, University of Texas Southwestern Medical Center, Dallas, TX
12/2011-	Director of Center for Cellular & Molecular Imaging, Biological and Cryo Electron Microscopy Core Facilities; Research Scientist, Department of Cell Biology, Yale University School of Medicine, New Haven, CT

Other Experience and Professional Memberships

1994-2001	Member, Association for Research in Vision and Ophthalmology
1997-2002	Member, American Society for Cell Biology
2001-2011	Member, Society for Neuroscience

1997-present Member, Microscopy Society of America

C. Contribution to Science

1. During my postdoctoral period, I have study the transport of phototansuction proteins in photoreceptor and retinal pigment epithelial cells (RPE), and their roles in visual diseases. My main contribution was to understanding of the disruption of opsin and arrestin transport though photoreceptor cilia and the RPE function in Usher syndrome mouse model (Myosin VIIa mutants) and in retinal degeneration model (kinesin mutant). The microscopy framework along with genetics and protein chemistry have provided strong evidence that how defective motor proteins impact the photoreceptor/RPE function and structure.
   a. Liu, X., Ondek, B. & Williams, D.S. (1998) Mutant myosin VIIa causes defective melanosome distribution in the RPE of shaker-1 mice. Nature Genetics, 19: 117-118. (PMID: 9620764)
   b. Liu, X., Udovichenko, I., Brown, S., Steel, K. & Williams, D.S. (1999) Myosin VIIa participates in opsin transport through the photoreceptor cilium. J. Neuroscience, 19: 6267-6274. (PMID:10414956)
   c. Williams, D., Liu, X., Vansant G. & Ondek, B. (1999) Blindness in Usher syndrome 1B: Myosin VIIa in retina. In: Retinal Degenerative Diseases and Experimental Therapy. Joe Hollyfield et al., eds. Kluwer Academic/Plenum Publishers, New York, pp.15-26.
   d. Marszalek, J., Liu, X., Roberts, E., Chui, D., Marth, J., Williams, D.S. & Goldstein, L.S.B. (2000) Genetic evidence for selective transport of opsin and arrestin by kinesin-II in mammalian photoreceptors. Cell, 102: 175-187. (PMID:10943838)

2. My contribution to neuroscience was to participate in studies to identify, structurally characterize synaptic proteins, such as adhesion molecule - SynCAM, protein links to autism - neuroligin, and proteins involved in synapse transmission and endocytosis - synaptobrevin, syntaxin and RIM proteins. These ultrastructural studies were incorporated in publications that elucidate mechanisms that how these proteins function at central synapses.
   a. Deak, F., Schoch, S., Liu, X., Südhof, T. S. & Kavalali, E. (2004) Synaptobrevin is essential for fast synaptic-vesicle endocytosis. Nature Cell Biology, 6: 1102-1108. (PMID:15475946)
   b. Tabuchi, K., Blundell, J., Etherton, M., Hammer, R., Liu, X., Powell, C. & Südhof, T.C. (2007) A neuroligin-3 mutation implicated in autism increases inhibitory synaptic transmission in mice. Science, 318: 71-76. (PMID:17823315)
   c. Kaeser, P., Deng, L., Sharma, M., Dulubova, I., Liu, X., Rizo J. & Südhof, T.C. (2011) RIM proteins tether Ca(2+) Channels to presynaptic active zones via a direct PDZ-domain interaction. Cell,144(2): 282-95. (PMID:21241895)
   d. Acuna, C., Li, X. & Südhof, T.C. (2016) "How to make an active zone: Unexpected universal functional redundancy between RIMs and RIM-BPs." Neuron, 91(4):792-807. (PMID: 27537484)

Complete List of Published Work in MyBibliography:
https://www.ncbi.nlm.nih.gov/sites/myncbi/1f3wgq96hVsAe/bibliography/51092218/public/?sort=date&direction=ascending

D. Research Support

2017 – 2019	Co-PI, a National Science Foundation - Major Instrument Grant “Acquiring a Focus Ion Beam Scanning Electron Microscope for Large Volume, High Resolution and 3D Imaging of Whole Cells”.
2016 - 2017	Co-PI, NIH Small Business Innovation Research grant: “Non-Antibody Labeling for Correlative Super-resolution & Electron Microscopy”. (Yale & Nanoprobes)