

Meng-meng Fu

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Education

Stanford University	Postdoctoral Fellow in Neurobiology	2014 – now
University of Pennsylvania	Ph.D. in Neuroscience	2007 – 2013
California Institute of Technology	B.S. in Biology (with Honors)	2002 – 2006

Research Experience

Ben Barres Lab (Stanford)		2014 – now
I initiated 2 projects to understand oligodendrocyte cell biology: 1) how microtubules nucleate outside of the cell body off of Golgi outposts, 2) how Mbp (myelin basic protein) mRNA is transported and locally translated. I use techniques spanning animal models, primary cell culture, biochemistry, and biophysics.		
Erika Holzbaur Lab (UPenn)		2008 – 2013
I studied the regulation of axonal transport using live-cell microscopy, biochemistry and biophysics techniques. I showed that phosphorylation of the adaptor protein JIP1 alters its association to kinesin versus dynein motors and controls the direction of APP and autophagosome transport.		
UPenn Rotations		2007
Virginia Lee and John Trojanowski Lab – quantified TDP-43 pathology in human ALS brains Harry Ischiropoulos Lab – characterized proteins secreted by astrocytes using proteomics		
Caltech Summer Undergraduate Research Fellowships		2003 – 2005
Paul Patterson Lab – measured A β plaques in an Alzheimer's mouse model after expression of the cytokine LIF Eric Davidson Lab – studied a transcription factor during gastrulation in sea urchin embryos Neil Shay Lab (U. of Notre Dame) – identified novel phytochemical ligands of PPAR receptors using cell culture		

Teaching Experience

UPenn Summer Research Academy		2012, 2013
Instructor / journal club leader – designed course on how to read papers (“Mechanisms of Neurodegeneration”)		
Teaching Assistant		
UPenn: BBB109 Introduction to Brain and Behavior		2009
Caltech: Bi1 Drugs and the Brain (2x), Bi145 Anatomy and Physiology		2005 – 2006
Kaplan Test Prep		2006 – 2007
Trained to teach SAT, GRE, MCAT; #1-rated SAT teacher in Los Angeles County in 2007		

Grants and Fellowships

National Multiple Sclerosis Society (NMSS) Postdoctoral Fellowship		2015 – 2018
NINDS Individual Postdoctoral NRSA Fellowship		2015
NIH/Stanford Developmental Biology and Neonatology Postdoctoral Training Grant		2014
NINDS Individual Predoctoral NRSA Fellowship		2011 – 2013
NIH/UPenn Systems and Integrative Biology Predoctoral Training Grant		2007 – 2009

Awards

ASCB Porter Prize for Research Excellence (Postdoc)	2019
UPenn Saul Winegrad Award for Outstanding Thesis in Neuroscience	2014
Caltech Robert L. Noland Leadership Award	2006
Caltech Summer Undergraduate Research Fellowship (SURF) Perpall Speaking Competition Semifinalist	2003 – 2005
Caltech Internal Scholarships Bing Scholarship Sunney Chan Scholarship	2003 – 2005
National-level Scholarships Robert Byrd Scholarship National Merit Scholarship Tylenol Scholarship	2002 – 2006
Intel International Science and Engineering Fair Scholarship, 3 rd Place, Gerontology	2002

Publications

Research Papers:

Fu MM [corresponding], McAlear T, Nguyen H, Osés-Prieto JA, Valenzuela A, Shi R, Perrino JJ, Huang TT, Burlingame AL, Bechstedt S, Barres BA (2019). The Golgi outpost protein TPPP nucleates microtubules and is critical for myelination. *Cell* 179:132-146.

Herbert AL, Fu MM [co-first, co-corresponding], Drerup CM, Gray RS, Harty BL, Ackerman SD, O'Reilly-Pol T, Johnson SL, Nechiporuk AV, Barres BA, Monk KR (2017). Dynein/dynactin is necessary for anterograde transport of *Mbp* mRNA in oligodendrocytes and for myelination *in vivo*. *PNAS* 114(43): E9153-E9162.

Zuchero JB, Fu MM, Sloan S, Ibrahim A, Olson A, Zaremba A, Dugas JC, Wienbar S, Caprariello AV, Kantor C, Leonoudakus D, Lariosa-Willingham K, Kronenberg G, Gertz K, Soderling SH, Miller RH, Barres BA. CNS myelin wrapping is driven by actin disassembly (2015). *Dev. Cell* 34(2):152-167.

Fu MM, Nirschl JJ, Holzbaur EL (2014). LC3 binding to the scaffolding protein JIP1 regulates processive dynein-driven transport of autophagosomes. *Dev. Cell* 29(5):577-590.

Fu MM, Holzbaur EL (2013). JIP1 regulates the directionality of APP axonal transport by coordinating kinesin and dynein motors. *J. Cell Biol.* 202(3):495-508.

Reviews:

Weigel M, Wang L, Nguyen H, Valenzuela A, Fu MM [corresponding] (2019). Microtubule organization and dynamics in oligodendrocytes, astrocytes, and microglia. *Developmental Neurobiology*, submitted (invited review).

Valenzuela A, Wang L, Weigel M, Fu MM [corresponding] (2019). Golgi outposts nucleate microtubules in cells with specialized shapes. *Cytoskeleton*, resubmitted (invited review).

Fu MM, Holzbaur EL (2014). MAPK8IP1/JIP1 regulates the trafficking of autophagosomes in neurons. *Autophagy* 10(11): 2079-2081.

Fu MM, Holzbaur EL (2014). Integrated regulation of motor-driven organelle transport by scaffolding proteins. *Trends Cell Biol.*, 24(10):564-574.

Perlson E, Maday S, Fu MM, Moughamian AJ, Holzbaur EL (2010). Retrograde axonal transport: pathways to cell death? *Trends Neurosci.* 33(7):335-344.

Independent Reviewer

Journal of Cell Biology
Journal of Neuroscience
Cytoskeleton

Journal of Visualized Experiments (JoVE)
Hong Kong Research Grants Council (RGC)

Invited/Selected Talks at Conferences

Myelin Gordon Conference

2020	Il Ciocco, Italy	Co-chair, Myelin Gordon Research Seminar (GRS)
2010	Ventura, CA	"How do oligodendrocytes make microtubules?"
2016	Il Ciocco, Italy	"Proteomic investigations of MBP mRNA transport in oligodendrocyte development"

EMBO Conference: Neuronal Cytoskeleton

2019	Villarrica, Chile	"The Golgi outpost protein TPPP nucleates microtubules and regulates branching in oligodendrocytes"
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ASCB (American Society for Cell Biology) Conference

2018	San Diego, CA	Motors Minisymposium: "Transport of <i>Mbp</i> mRNA by dynein and myosin motors in oligodendrocytes is critical for local translation and myelination"
2017	Philadelphia, PA	Subcellular Organization of Neural Cells Minisymposium: "The Golgi outpost protein TPPP mediates uniform microtubule polarity and branching in oligodendrocytes"
2013	New Orleans, LA	Cell Biology of the Neuron Minisymposium: "The scaffolding protein JIP1 facilitates retrograde autophagosome transport in axons via associations with LC3 and dynactin"
2012	San Francisco, CA	Special Interest Subgroup on Axonal Transport: "Regulation of axonal transport by scaffolding proteins: JIP1 sustains long distance kinesin-mediated motility"
2010	Philadelphia, PA	Motors Minisymposium: "JNK-induced changes in axonal transport are mediated by the bidirectional co-regulator JIP1"

Molecular and Cellular Neurobiology Gordon Conference

2018	Hong Kong, China	"The Golgi outpost protein TPPP nucleates microtubules and is critical for myelination"
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Cell Biology of the Neuron Gordon Conference

2018	Waterville Valley, NH	"The Golgi outpost protein TPPP nucleates microtubules and is critical for myelination"
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EMBO Conference: Cell Biology of the Neuron

2017	Heraklion, Greece	"Golgi outposts mediate uniform microtubule polarity in oligodendrocytes"
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Training and Workshops

4D Advanced Microscopy of Brain Circuits Course (UC Berkeley)

2016

1-week course with laboratory rotations and projects. Topics: two-photon microscopy, calcium imaging, super-resolution microscopy, lightsheet microscopy, linear unmixing, and automated image analysis.

Analysis Techniques for the Biosciences using MATLAB (Stanford, NENS230)

2014

Quarter-long class. I learned how to write MATLAB scripts, which I use for semi-automated analysis of imaging data.

Trainees

Yvette Wong (Holzbaur Lab rotation student)
Becky Shi (Barres Lab rotation student)
Ved Kopkar (Current collaborator, MD/PhD student)
Alex Valenzuela (Barres Lab research associate)
Madhu Nori (Barres Lab summer undergraduate)
Lynn Serizawa (Barres Lab summer undergraduate)

Now: Postdoc in Dimitri Krainc Lab (Northwestern)
Now: PhD student in Kang Shen Lab (Stanford)
Now: MD/PhD student in Rhiju Das Lab (Stanford)
Now: MD student (UCLA)
Now: MD student (Brown)
Now: Undergrad (NYU)