

STEPHANIE A HERRLINGER, Ph.D.

Columbia University
 Postdoctoral Fellow
 Mortimer B. Zuckerman Mind Brain Behavior Institute
 Jerome L. Greene Science Center; L5-053
 3227 Broadway, New York, NY 10027
sah2245@columbia.edu ~ StephanieHerrlinger@gmail.com

EDUCATION

Doctor of Philosophy
 Received Fall 2018

University of Georgia; Mentor: Dr. Jian-Fu (Jeff) Chen
 Neuroscience, Biomedical and Health Sciences Institute
 Dissertation: Beyond the Undergrowth: Causes of Neural Tube Defects and Microcephaly

Bachelor of Science
 Received Spring 2010

University of Rochester; Mentor: Dr. Steven Goldman
 Molecular Genetics, Department of Biology
 Distinction in Research. Thesis title: Brain Gene Therapy

RESEARCH POSITIONS

02/2019 – current
 Columbia University

Postdoctoral Mentors: **Dr. Joseph Gogos and Dr. Attila Losonczy**
 Focus: Correlating physiology and transcription during learning in a model for the 22q11.2 deletion

Schizophrenic (SCZ) patients exhibit cognitive deficits including defective episodic memory and working memory. Previous work done in a mouse model for 22q11.2 deletion syndrome, the largest genetic known risk for SCZ, indicated that disrupted hippocampal place cell activity may contribute to this pathophysiology. This project aims to identify the biological processes underlying these defects in the hippocampus by directly linking changed physiological properties and altered transcriptional profiles in hippocampal place cells during goal directed learning in normal mice and a transgenic model for 22q11.2 deletion syndrome.

08/2013 – 12/2018
 University of Georgia,
 University of Southern California

Doctoral Mentor: **Dr. Jian-Fu (Jeff) Chen**
 Focus: 1) ZIKV-induced microcephaly 2) Post-transcriptional regulation of neurodevelopment by RNA-binding protein Lin28

Brain development requires precise regulation of neural progenitor cells (NPCs), the disruption of which results in neurodevelopmental disorders including neural tube defects and microcephaly. By developing an *in utero* intracranial inoculation method, I focused on how flaviviruses, particularly the Zika virus and Dengue virus, impact neural progenitor cells (NPCs) and vascular development in the developing brain leading to Microcephaly, and how the different lineages of the Zika virus exhibit differential virulence *in vivo* (*Development* 2016, 2017, *JoVE* 2018). The second major focus of my dissertation has been to examine the role of post-transcriptional regulators in brain development and NPCs by studying the RNA-binding protein Lin28. Using mouse genetic approaches, *in vivo* polysome profiling studies and subsequent RNA-seq of polysome-associated fractions to isolate actively translated transcripts, I was able to identify that Lin28 drives NPC expansion by promoting mRNA translation and by specifically regulating subsets of genes important for ribosome biogenesis and translation initiation (*under review at Development*).

05/2010 – 06/2013
 University of Rochester
 Research Associate

Research Mentors: **Dr. Steven Goldman & Dr. Abdellatif Benraiss**
 Focus: Glial contributions to Huntington's Disease

My project aim was to create an in-vivo model to study the hypothesis that astrocytes contribute to the pathology of Huntington's Disease (HD). Firstly, I established and quantified a chimeric murine model using human fetal cells to provide healthy astrocytes to counter HD effects in a mouse model for Huntington's disease, the R6/2. Secondly, we created HD human glial cell lines via lentiviral infection expressing various huntingtin gene expansions and performed xenografts in

mice to observe varying degrees of disease pathology in HD human astrocytes *in vivo*. The HD mice that received healthy astrocytes performed better in memory and learning behavior tests than control mice; healthy mice that received HD glia performed poorer than control mice. We discovered that not only do glia exhibit dysfunction in HD, they can also cause behavioral deficits independent from neuron dysfunction (*Nature Communications* 2016).

05/2008 – 05/2010
University of Rochester
Principle Investigator: **Dr. Steven Goldman**
Focus: Brain gene therapy as endogenous therapy for Huntington's Disease.
Undergraduate Thesis

08/2007 – 05/2008
University of Rochester
Principle Investigator: **Dr. Richard Glor**
Independent study: Ecological and Niche Modeling of *Anolis segei* in Cuba
Undergraduate Research Project

05/2006 – 08/2007
Innovative Biotherapies Inc.
Ann Arbor, Michigan
Lead Scientist: **Dr. David Humes** (University of Michigan)
Focus: Cell culture and efficacy of kidney cells for large scale animal trials.
Lab Technician

05/2004 – 08/2004
University of Michigan
Principle Investigator: **Dr. James Shayman**
Focus: Management of immune deficient mouse colony.
Lab Technician

PUBLICATIONS

- (8) **Stephanie Herrlinger**, Qiang Shao, Mei Yang, Gustavo Martinez, Yang Liu, Xiaohan Pan, Hang Yin, Li-Wei Xie, Jian-Fu Chen. Lin28-mediated promotion of translation is critical for neural progenitor cell maintenance and brain development in mice. (2018) *Under review at Development*.
- (7) **Stephanie Herrlinger**, Qiang Shao, Li Ma, Yanan Zhu, Melinda A. Brindley, and Jian-Fu Chen. Establishing mouse models for Zika virus-induced neurological disorders using intracerebral injection strategies: embryonic, neonatal, and adult. (2018) *Journal of Visualized Experiments (JoVE)*, 10.3791/56486.
- (6) Qiang Shao*, **Stephanie Herrlinger***, Yanan Zhu, Mei Yang, Forrest Goodfellow, Xiao-Peng Qi, Fan Lai, Melinda A. Brindley, and Jian-Fu Chen. (2017) African Zika Virus is More Virulent and Causes More Severe Brain Damage with Postnatal Death Compared to Asian Lineage and Dengue Virus. *Development*, 10.1242/dev.156752. * **co-first authorship**
- (5) Qiang Shao*, **Stephanie Herrlinger***, Si-Lu Yang, Fan Lai, Julie M. Moore, Melinda A. Brindley, and Jian-Fu Chen. (2016) Zika virus infection disrupts neurovascular development and results in postnatal microcephaly with brain damage. *Development*, 143: 4127-4136. * **co-first authorship**
- (4) Mei Yang, Chen Liang, Kunchithapadam Swaminathan, **Stephanie Herrlinger**, Fan Lai, Ramin Shiekhataar, and Jian-Fu Chen. (2016) A C9ORF72/SMCR8-containing complex regulates ULK1 and plays a dual role in autophagic flux. *Science Advances*, Vol. 2, no. 9, e1601167.
- (3) Benraiss, S. Wang, **S. Herrlinger**, X. Li, D. Chandler-Millitello, J. P. Mauceri, H. B. Burm, M. J. Toner, Q. Xu, F. Ding, F. Wang, N. Kang, J. Kang, M. S. Windrem, I. Munoz-SanJuan, M. Nedergaard, S. A. Goldman. (2016) Human glia can both induce and rescue aspects of disease phenotype in Huntington's disease. *Nature Communications*, 7:11758.
- (2) Si-Lu Yang, Mei Yang, **Stephanie Herrlinger**, Chen Liang, Fan Lai, and Jian-Fu Chen (2015). MiR-302/367 regulate neural progenitor proliferation, differentiation, and survival in neurulation. *Developmental Biology*, 408(1):140-50.

- (1) Mei Yang, Si-Lu Yang, **Stephanie Herrlinger**, Monika Dzieciatkowska, Kirk Hansen, Lee Niswander, Eric Moss, and Jian-Fu Chen (2015). Lin28 promotes the proliferative capacity of neural progenitor cells in brain development. *Development*, 142(9):1616-27.

AWARDS & FELLOWSHIPS

06/2018 \$200	<u>Best Pre-Doctoral Oral Presentation.</u> NEURAL conference, University of Alabama Roadmap Scholars, Birmingham, AL.
04/2018	<u>Best Pre-Doctoral Poster Award.</u> Herman Ostrow School of Dentistry Research Day 2018.
09/2017 - 09/2023 \$294,292	<u>NIH Blueprint Diversity Specialized Predoctoral to Postdoctoral Advancement in Neuroscience (D-SPAN) Award (F99/K00).</u> National Institute of Mental Health (NIMH); Grant #: 1F99NS105187-01 Title: Correlating physiology and transcription during learning in a model for the 22q11.2 deletion.
09/2017 \$775	<u>Franklin Foundation Travel Award.</u> Purpose: Travel to Society for Neuroscience conference in Washington D. C.
08/2016 - 07/2019 \$30,000	<u>Achievement Rewards for College Scientists (ARCS) Global Impact Award.</u> Purpose: Examine the effects of ZIKV on brain development and genetic causes of Microcephaly.
07/2015 – 08/2017 \$27,000	<u>T32 Predoctoral Training Grant in Genetics.</u> National Institute of General Medical Sciences (Funding agency) Grant #: 2T32GM007103-42 Purpose: Examine the biological function of ALS/FTD associated gene C9orf72 <i>in vivo</i> .
07/2015 – 06/2016 \$2,500	<u>Mary Erlanger Graduate Fellowship for Aging Research.</u>
08/2013 – 09/2014 \$19,000	<u>Scholars of Excellence Fellowship.</u> (Research assistantship)
08/2013 – 09/2014 \$5,000	<u>Foundation Graduate Fellowship.</u>
08/2013 – 09/2014 \$3,000	<u>EGRF Award.</u>
01/2010 – 05/2010	<u>Distinction in Research.</u> Undergraduate thesis title: Brain Gene Therapy
08/2008 – 05/2010	<u>Dean's List</u>

RESEARCH SKILLS

Stereotaxic brain surgery in embryonic, neonatal, and adult rodents, rodent embryonic stage embryo/embryonic brain/adult brain dissection, immunodeficient colony management, aseptic technique, anesthesia, euthanasia, immunohistochemistry, histology, confocal microscopy, rodent behavioral testing, cryostat sectioning, transcatheter perfusions, polysome profiling, RNA isolation, RT-PCR, genotyping, basic cell culture, basic biochemistry, cloning and vectorology. Professional use of Photoshop©, Illustrator©, StereoInvestigator© and NeuroLucida©.

CONFERENCE PRESENTATIONS
Talks:

- (2) Lin28-mediated promotion of translation is critical for neural progenitor cell maintenance and brain development in mice. University of Alabama NEURAL conference. Birmingham, AL. (June 2018)
- (1) Translational Control of Neural Precursor Cell Behaviors in Neurodevelopment. University of Georgia Developmental Biology Retreat. Athens, GA. (April 2016)

Posters:

- (11) **Stephanie Herrlinger**, Qiang Shao, Mei Yang, Gustavo Martinez, Yang Liu and Jian-Fu Chen. Lin28-mediated mRNA translation promotion is critical for neural progenitor cell behavior and brain development (April 4, 2018). Poster was presented at the Herman Ostrow School of Dentistry of USC Research Day in Los Angeles, CA.
- (10) **Stephanie Herrlinger**, Qiang Shao, Mei Yang, Gustavo Martinez, Yang Liu and Jian-Fu Chen. Lin28-mediated mRNA translation promotion is critical for neural progenitor cell behavior and brain development (November 10-15, 2017). Poster was presented at the Society for Neuroscience Conference in Washington D. C.
- (9) **Stephanie Herrlinger**, Mei Yang, Chen Liang, Kunchithapadam Swaminathan, Fan Lai, Ramin Shiekhattar, and Jian-Fu Chen (July 23-27, 2017). A C9ORF72/SMCR8-containing complex regulates ULK1 and plays a dual role in autophagy. Poster was presented at the Gordon Research Conference Amyotrophic Lateral Sclerosis (ALS) & related Motor Neuron Diseases, Stowe, VT.
- (8) **Stephanie Herrlinger**, Hector Barreto, Aaron Alcala, Mike Choromanski, Karl Kudyba, and Jian-Fu Chen. (April 2017) Microcephaly associated gene *Wdr62*^{-/-} mice are infertile with severe testis malformation and abnormal germ cell differentiation. Poster was presented at the University of Georgia Developmental Biology Retreat. Athens, GA.
- (7) Mei Yang, Chen Liang, Kunchithapadam Swaminathan, **Stephanie Herrlinger**, Fan Lai, Ramin Shiekhattar, and Jian-Fu Chen (Jan. 9-14, 2017). A C9ORF72/SMCR8-containing complex regulates ULK1 and plays a dual role in autophagy. Poster was presented at the Wellcome Genome Campus Course in Molecular Neurodegeneration, Cambridge, UK.
- (6) **Stephanie Herrlinger**, Qiang Shao, Jian-Fu Chen. Dengue Virus infection in brain development causes Microcephaly that is less severe when compared with Zika Virus-induced Microcephaly. (October 2016) Poster presented at Annual Developmental Biology Symposium at the University of Georgia.
- (5) **Stephanie Herrlinger**, Qiang Shao, Jian-Fu Chen. Zika virus infection disrupts neurovascular development and results in postnatal microcephaly with brain damage. (August 2016) Poster presented at Annual Genetics Department Retreat at the University of Georgia, Athens, GA.
- (4) **Stephanie Herrlinger**, Qiang Shao, Gustavo A. Martínez-Muñiz, Jian-Fu Chen (May 2016). Translational Control of Neural Progenitor Cell Behaviors in Neurodevelopment. Poster was presented at the Southeast Regional Society for Developmental Biology Annual Meeting at the Whitney Laboratory, St. Augustine, FL.
- (3) Mei Yang, Si-Lu Yang, **Stephanie Herrlinger**, Monika Dzieciatkowska, Kirk Hansen, Lee Niswander, Eric Moss, and Jian-Fu Chen (September 2015). Lin28a and Lin28b play overlapping functions to temporally regulate embryonic neural stem cell proliferation and brain development. Poster presented at the Developmental Biology Symposium, Athens, GA.
- (2) Mei Yang, Si-Lu Yang, **Stephanie Herrlinger**, Monika Dzieciatkowska, Kirk Hansen, Lee Niswander, Eric Moss, and Jian-Fu Chen (July 2015). Lin28a and Lin28b play overlapping functions to temporally regulate

embryonic neural stem cell proliferation and brain development. Poster presented at the 2015 Annual Society for Developmental Biology National Conference at Snowbird, Salt Lake City, UT.

- (1) S. Wang, **S. Herrlinger**, X. Li, A. Benraiss, M. S. Windrem, S. A. Goldman (2013). Striatal chimerization with hESC-derived glia expressing mutant huntingtin is sufficient to impair motor learning and coordination. Poster presented at the international 2013 Society for Neuroscience conference in San Diego, CA.

PROFESSIONAL MEMBERSHIPS AND EXPERIENCE

Member of the Society of Developmental Biology (2015-)

Member of the Society of Neuroscience (2010-)

Co-President of the Developmental Biology Graduate Student Association: I served an executive role on a graduate student-lead committee that organizes events for the developmental biology community at UGA. This past year we have founded the UGA Developmental Biology GSA and have planned, chose and invited speakers, and ran events such as the very successful Developmental Biology Symposium in the fall, the Developmental Biology Retreat in the spring, and recruitment events and new-student welcome events in the winter.

TEACHING

UNIVERSITY OF GEORGIA

Teaching Assistantship: For the undergraduate Neurobiology course, CBIO 3800, under professors Dr. James Lauderdale and Dr. Jian-Fu Chen. For this course, I mentored students in office hours biweekly, lead a weekly evening break-out session to review material taught in the previous week, and graded exams.

Graduate Lab Assistantship: I taught 3 2-hour sections of an undergraduate laboratory course per week in which I was the students' sole lecturer and instructor during the Fall of 2015. For this course, I instructed, guided students through experiments, held office hours, and graded all assignments, including prelabs, laboratory procedure reports, and significant writing assignments.

Undergraduate Mentorship: I have mentored three CURO students during the school year in their independent research work in the laboratory of Dr. Jianfu Chen. In addition, I have mentored two SUNFIG student interns from Puerto Rico in the summers teaching them lab techniques and experimental design, and preparing them to present their own acquired data in a poster session and thesis by the end of the summer.

UNIVERSITY OF ROCHESTER

Undergraduate mentorship: I mentored numerous undergraduate students that were performing independent study credits or volunteers in the laboratory of Dr. Steven Goldman. I taught them how to use imaging technology such as StereoInvestigator© and NeuroLucida©, mouse animal husbandry and tissue processing, and Immunohistochemistry.

GRADUATE COURSEWORK

Genetic approaches to Neurodevelopment, Psychopharmacology, Neurophysiology, Neuroanatomy, Neuroscience Seminar (8 semesters), Neuroscience Journal Club (8 semesters), Evolution & Development, Proteomics, Electron Microscopy, Grant Writing, Biostatistics, Course Design, Writing Intensive Program, Responsible Conduct in Research. *Training Course:* Wellcome Genome Campus Course in Molecular Neurodegeneration: Jan. 9-14, 2017, in Cambridge, UK.
