

# Chen Liu

Curriculum Vitae (6/2022)

Center for Hypothalamic Research  
Department of Internal Medicine  
Department of Neuroscience  
Peter O'Donnell Jr. Brain Institute

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## Appointments

### Associate Professor (with tenure)

Depts. of Internal Medicine and Neuroscience  
**Investigator**, Peter O'Donnell Jr. Brain Institute  
Neuroscience Graduate Program  
Molecular Metabolism & Metabolic Diseases Track  
University of Texas Southwestern Medical Center, 2015.9-present

## Education

### Case Western Reserve University, Cleveland, OH, 2004-2010.

Ph.D., Dept. of Neurosciences, School of Medicine.  
Pet-1 Is Required Across Different Stages of Life to Regulate Serotonergic Function.  
Mentor: Evan S. Deneris, Ph.D.

### UT Southwestern Medical Center, Dallas, TX, 2011-2015.

Postdoctoral training in neural control of energy and glucose metabolism.  
Mentor: Joel K. Elmquist, Ph.D., D.V.M.

## Research Statement

I am an investigator in neuroscience and metabolism research.

I trained as a neurobiologist studying the developmental origins of mood disorders (Liu et al., **Nature Neuroscience, 2010**). I then completed my fellowship training in energy and glucose metabolism with a focus on the vagus nerves (Liu et al., **Cell Metabolism, 2014**).

Our group studies how the brain controls energy and glucose balance. Ongoing research focuses on addressing three problems in neuroscience, metabolism, and medicine: 1) We explore the brain circuits that regulate appetitive behaviors (e.g. Park et al., **Nature Neuroscience, 2020**; Yoo et al., **Cell Reports, 2021**; Li et al., **Journal of Experimental Medicine, 2022**) to develop novel therapeutic strategies for treating obesity and diabetes; 2) We study genetic factors that cause severe, early-onset obesity in humans (e.g. Chen et al., **Journal of Neuroscience, 2020**); 3) our group is one of the few labs that conduct NIH-sponsored research on antipsychotic drugs (APDs)-induced metabolic syndrome (e.g., Lord et al., **Journal of Clinical Investigation, 2017**, Li et al., **Journal of Experimental Medicine, 2021**). We employ a multi-disciplinary approach to investigate the etiology behind this pressing clinical problem currently affecting millions of patients.

## Diversity Statement

The Chen Liu lab at the University of Texas Southwestern Medical Center studies genetic and environmental factors leading towards metabolic syndromes such as obesity and type-II diabetes. Many of these conditions differentially impact Black, Indigenous, and People of Color (BIPOC) with significantly higher morbidity and mortality rates. The overarching goal of our research is to develop mechanism-

based therapies to improve the lives of patients from all ethnic backgrounds.

Since the opening in 2015, the lab has been actively supporting and training members who are women, immigrants, and underrepresented minorities (URM). We encourage and welcome trainees and staff members from all races, ethnicities, genders, and religions to be a member of our lab family. We firmly believe that scientific innovation can benefit from a diversity of perspective, background, and ability. Moreover, equal opportunities represent a fundamental goal of our society.

We recognize that institutional and systemic racism still exists in today's academia and medicine. To confront these issues, each member of our lab pledges to fight workplace racism, unconscious bias, and discrimination. We are committed to continuing to pursue efforts to enhance diversity, equity, and inclusion.

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### Selected publications (Corresponding † and first author\* ONLY)

Li L, Wyler SC, Leon-Mercado LA, Xu B, Oh Y, Swati, Chen X, R Wan, Arnold AG, Jia L, Wang G, Nautiyal K, Hen R, Sohn JW†, **Liu C†**. Delineating a serotonin receptor pathway for appetite suppression (2022). **J. Exp Med.**

Yoo ES, Li L, Jia L, Lord CC, Lee CE, Vianna CR, Berglund ED, Cunningham KA, Xu Y, Sohn JW†, **Liu C†**. Gai/o-coupled Htr2c in the Paraventricular Nucleus of the Hypothalamus Antagonizes the Anorectic Effect of Serotonin Agents (2021). **Cell Rep.**

Li L, Yoo ES, Li X, Wyler SC, Chen X, R Wan, Arnold AG, Birnbaum SG, Jia L, Sohn JW† **Liu C†**. The atypical antipsychotic risperidone targets hypothalamic melanocortin 4 receptors to cause weight gain. (2021). **J. Exp Med.**

Chen X, Wyler SC, Li L, Arnold AG, Wan R, Jia L, Landy MA, Lai HC, Xu P, **Liu C†**. Comparative transcriptomic analyses of developing melanocortin neurons reveal new regulators for the anorexigenic neuron identity (2020). **J. Neurosci.**

Park S, Williams KW, **Liu C†**, Sohn JW†. A neural basis for tonic suppression of sodium appetite (2020). **Nat. Neurosci.**

Lord, CC, Wyler SC, Wan, R, Castorena, CM, Ahmed, N, Mathew, D, Lee, S, **Liu, C†**, Elmquist JK† (2017). The atypical antipsychotic olanzapine targets Htr2c to cause weight gain. **J. Clin. Invest.**

Wyler, SC, Lord, CC, Lee, S, Elmquist, JK, **Liu, C†** (2017). Serotonergic control of metabolic homeostasis. **Front. Cell. Neurosci.**

**Liu, C.\***, Bookout, A.L.\*, Lee, S., Sun, K., Jia, L., Lee, C., Udit, S., Deng, Y., Scherer, P.E., Mangelsdorf, D.J., et al. (2014). PPARgamma in vagal neurons regulates high-fat diet induced thermogenesis. **Cell Metab.**

**Liu, C.**, Lee, S., and Elmquist, J.K. (2014). Circuits controlling energy balance and mood: inherently intertwined or just complicated intersections? **Cell Metab.**

Wang, Q.\*, **Liu, C.\***, Uchida, A., Chuang, J.-C., Walker, A., Liu, T., Osborne-Lawrence, S., Mason, B.L., Mosher, C., Berglund, E.D., et al. (2014). Arcuate AgRP neurons mediate orexigenic and glucoregulatory actions of ghrelin. **Mol. Metab.**

Berglund, E.D.\*, **Liu, C.\***, Sohn, J.-W., Liu, T., Kim, M.H., Lee, C.E., Vianna, C.R., Williams, K.W., Xu, Y., and Elmquist, J.K. (2013). Serotonin 2C receptors in pro-opiomelanocortin neurons regulate energy and glucose homeostasis. **J. Clin. Invest.**

**Liu, C.** and Elmquist, J.K. (2012). Tipping the scales early: probing the long-term effects of obesity. **J. Clin. Invest.**

**Liu, C.**, and Deneris, E.S. (2011). Transcriptional control of serotonin-modulated behavior and physiology. **Neuropsychopharmacology**.

**Liu, C.**, Maejima, T., Wyler, S.C., Casadesus, G., Herlitze, S., and Deneris, E.S. (2010). Pet-1 is required across different stages of life to regulate serotonergic function. **Nat. Neurosci**.

## Other Publications

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Shankar K, Metzger NP, Singh O, Mani BK, Osborne-Lawrence S, Varshney S, Gupta D, Ogden SB, Takemi S, Richard CP, Nandy K, **Liu, C**, Zigman JM (2021). LEAP2 deletion in mice enhances ghrelin's actions as an orexigen and growth hormone secretagogue. **Mol Metab**.

Landy MA, Goyal M, Casey KM, **Liu C**, Lai HC (2021). Loss of Prdm12 during development, but not in mature nociceptors, causes defects in pain sensation. **Cell Rep**.

Castorena CM, Caron A, Michael NJ, Ahmed NI, Arnold AG, Lee J, Lee C, Limboy C, Tinajero AS, Grainer M, Wang S, Horton JD, Holland WL, Lee S, **Liu C**, Fujikawa T, Elmquist JK (2021). CB1Rs in VMH Neurons Regulate Glucose Homeostasis but not Body Weight. **Am J Physiol Endocrinol Metab**.

Shankar K, Gupta D, Mani BK, Findley BG, Osborne-Lawrence S, Metzger NP, **Liu C**, Berglund ED, Zigman JM (2020). Ghrelin Protects Against Insulin-Induced Hypoglycemia in a Mouse Model of Type 1 Diabetes Mellitus. **Front Endocrinol**.

Shankar K, Gupta D, Mani BK, Findley BG, Lord CC, Osborne-Lawrence S, Metzger NP, Pietra C, **Liu C**, Berglund ED, Zigman JM (2019). Acyl-ghrelin is Permissive for the Normal Counterregulatory Response to Insulin-induced Hypoglycemia. **Diabetes**.

Rodriguez JA, Bruggeman EC, Mani BK, Osborne-Lawrence S, Lord CC, Roseman HF, Viroslav HL, Vijayaraghavan P, Metzger NP, Gupta D, Shankar K, Pietra C, **Liu C**, Zigman JM (2018). Ghrelin Receptor Agonist Rescues Excess Neonatal Mortality in a Prader-Willi Syndrome Mouse Model. **Endocrinology**.

Jia L, Chang X, Qian S, **Liu, C**, Lord CC, Ahmed N, Lee CE, Lee S, Gautron L, Mitchell MC, Horton JD, Scherer PE, Elmquist JK (2018). Hepatocyte toll-like receptor 4 deficiency protects against alcohol-induced fatty liver disease. **Mol Metab**.

Caron A, Dungan Lemko HM, Castorena CM, Fujikawa T, Lee S, Lord CC, Ahmed N, Lee CE, Holland WL, **Liu C**, Elmquist JK (2018). POMC neurons expressing leptin receptors coordinate metabolic responses to fasting via suppression of leptin levels. **Elife**.

Santoro A, Campolo, M, **Liu, C**, Sesaki, H, Meli, R, Liu, Z, Kim JD, Diano, S (2017). DRP1 suppresses leptin and glucose sensing of POMC neurons. **Cell Metab**.

He Y, Shu G, Yang Y, Xu P, Xia Y, Wang C, Saito K, Hinton A Jr, Yan X, **Liu C**, Wu Q, Tong Q, Xu, Y (2016). A Small Potassium Current in AgRP/NPY Neurons Regulates Feeding Behavior and Energy Metabolism. **Cell Rep**.

Jackson AC, **Liu, C**, Fukuda M, Lazarus M, Gautron L (2015). Neuroanatomy and transgenic technologies. **Front Neuroanat**.

Jia, L., Vianna, C.R., Fukuda, M., Berglund, E.D., **Liu, C.**, Tao, C., Sun, K., Liu, T., Harper, M.J., Lee, C.E., et al. (2014). Hepatocyte Toll-like receptor 4 regulates obesity-induced inflammation and insulin resistance. **Nat. Commun**.

Chen, Z., Holland, W., Shelton, J.M., Ali, A., Zhan, X., Won, S., Tomisato, W., **Liu, C.**, Li, X., Moresco, E.M.Y., et al. (2014). Mutation of mouse *Samd4* causes leanness, myopathy, uncoupled mitochondrial respiration, and dysregulated mTORC1 signaling. ***Proc. Natl. Acad. Sci. U. S. A.***

Oh, E., Maejima, T., **Liu, C.**, Deneris, E., and Herlitze, S. (2010). Substitution of 5-HT1A receptor signaling by a light-activated G protein-coupled receptor. ***J. Biol. Chem.***

## Research Support

### Chen Liu Ph.D.

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#### Ongoing:

**1 R01 DK114036 (PI, Liu) 7/1/2017-12/31/2026**

*Hypothalamic Serotonin Receptors and Olanzapine-induced Metabolic Syndrome*

**1 R01 DK130892-01 (PI, Liu) 1/1/2022-12/31/2025**

*A Human Genetic Variant Ties Defective Hypothalamic Development to Obesity and Diabetes*

**UTSW Medical Foundation Research Start-up (PI, Liu) 9/1/2015-present**

#### Completed:

2020 Scientist Development Award (AHA 16SDG2726001)  
2019 Pilot & Feasibility Award (NIH U01NS090405)  
2018 Pilot & Feasibility Award (UTSW)  
2018 Grossman Endowment Award for Diabetes Research  
2016 Beginning Grant-in-Aid Award (AHA 16BGIA27260023)  
2014 Fellowship, Davis Foundation in Eating Disorder Research.  
2014 Fellowship, American Diabetes Association.  
2011 Ruth L. Kirschstein National Research Service Award (T32).

## Awards and Honors

6/2022 Junior Investigator Award, Chinese American Diabetes Association  
**6/2018 Grossman Award for Excellence in Diabetes Research**  
3/2015 Postdoctoral Travel Award, UTSW  
1/2014 Scholarship, Keystone Symposium 2014, Vancouver, Canada.  
1/2014 Scholarship, Molecular Neuroanatomy Course, Allen Brain Institute.  
**10/2011 Fellowship, Davis Foundation in Eating Disorder Research.**  
1/2011 Ruth L. Kirschstein National Research Service Award (NRSA).  
**4/2011 Doctoral Excellence Award, Case Western Reserve University.**  
5/2010 Vance Lemmon Award, Case Western Reserve University.

**5/2008 The President's Award, Case Western Reserve University.**

5/2008 Excellence in Science Program, American Association for the Advancement of Science (AAAS)

## Invited Talks

11-03-2022 Department of Neuroscience, Case Western Reserve University, OH.

**02-01-2021 Keystone Symposium: Obesity: From Cell to Patient, 2021 (virtual)**

12-09-2020 Korean Basic Dental Science Society 19<sup>th</sup> Annual Meeting (virtual)

**09-23-2019 International Brain Research Organization Conference, Daegu, Korea**

06-26-2017 Teratology Society 57<sup>th</sup> Annual Meeting, Denver, CO.

**11-01-2016 Peter A. Getting Lecture, University of Iowa, Iowa City, IA.**

09-08-2016 New Faculty Research Forum, UT Southwestern Medical Center.

06-25-2016 Partners Against Mortality in Epilepsy (PAME), Washington, DC.

12-04-2015 American Society for Epilepsy Annual Meeting, Philadelphia, PA.

11-20-2015 Department of Neurology, Baylor College of Medicine, Houston, TX.

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## Ad hoc Reviewer & Guest Editor

### **Early-career reviewer for eLife**

*Ad hoc Reviewer for NIH DDK-B Study Section*

*Fellowship Signaling 1 Review Committee, American Heart Association*

*Basic Science 8 Peer Review Committee, American Heart Association*

*Ad hoc Reviewer for EMBO Reports, EMBO Molecular Medicine, eLife, Endocrine Reviews, Epilepsia, Frontiers in Neuroscience, Frontiers in Neuroanatomy, Int. J. of Developmental Neuroscience, J. of Comparative Neurology, Molecular Metabolism, Molecular Psychiatry, Nature Communications, Plos Biology, Plos One, Physiology & Behavior, Psychopharmacology, Trends in Neurosciences, etc.*

## Memberships and Services

2008 - Society for Neuroscience

2008 - American Association for the Advancement of Science (AAAS)

2012 - Elected member, Sigma Xi

2013- American Heart Association (AHA)

2016- The Obesity Society

2021- Society for the Study of Ingestive Behavior

2021- Chinese American Diabetes Association