

CURRICULUM VITAE

NAME: David H. McDougal, Ph.D.

ACADEMIC RANK: Assistant Professor-Research

CONTACT INFORMATION

Pennington Biomedical Research Center
6400 Perkins Road
Baton Rouge, LA 70808
225-763-0278 (phone)
David.McDougal@pbrc.edu

EDUCATION

December, 1999	Bachelor of Science – Biological Sciences, Louisiana State University, Baton Rouge, LA
December, 2001	Bachelor of Science – Psychology, Louisiana State University, Baton Rouge, LA
December, 2008	Doctor of Philosophy – Vision Sciences, University of Alabama, Birmingham, AL
May, 2020	Masters of Science in Clinical Research- Tulane University, New Orleans, LA

PROFESSIONAL EXPERIENCE

10/2008 – 1/2010	Postdoctoral Researcher, Autonomic Neurosciences, Pennington Biomedical Research Center, Louisiana State University, Baton Rouge, LA
1/2010 – 10/2013	Instructor, Autonomic Neurosciences, Pennington Biomedical Research Center, Louisiana State University, Baton Rouge, LA.
10/2013 – present	Assistant Professor-Research , Neurobiology of Metabolic Dysfunction, Pennington Biomedical Research Center, Louisiana State University, Baton Rouge, LA.

PROFESSIONAL ORGANIZATION MEMBERSHIPS

American Diabetes Association
The Obesity Society

HONORS AND AWARDS

LSU Honors Scholarship, Louisiana State University
American Diabetes Association Young Investigator Travel Grant Award

GRANTS AND CONTRACTS SUPPORT

Active grants

1. U54 GM104940 Kirwan, JOHN P. (PI) 09/01/2019 - 08/31/2020 1.00
NIH/NIGMS Louisiana Clinical and Translational Sciences Center (LA CaTS) diabetes focused pilot grant program.
Evaluating glial acetate metabolism as a biomarker of hypoglycemic complications in diabetic patients: A proof of concept study.
This project will establish whether alterations in glial acetate metabolism are associated with hypoglycemic complications in patients with type 1 diabetes.
Role: Project PI
2. R01 DK 108765 Rogers, RC (PI) 10/01/2016 09/30/2020 5.00
Astrocytes, glucose detection, and counter-regulation.
Role: Co-Investigator

Completed grants

1. U54 GM104940 Kirwan, JOHN P. (PI) 07/01/2019 – 06/30/2020 2.00
 NIH/NIGMS Louisiana Clinical and Translational Sciences Center (LA CaTS) Roadmap Scholar Program
 Evaluating glial acetate metabolism as a biomarker of hypoglycemic counterregulation using ¹³C magnetic resonance spectroscopy.
 This project will establish novel methodologies, develop fundamental knowledge regarding the relationship between glial metabolism and hypoglycemia, and develop preliminary data supporting a clinical trial.
 Role: Project PI (Roadmap Scholar)

2. 1-15-JF-3 McDougal, David (PI) 07/01/2015 12/31/2018 3.00
 American Diabetes Association Junior Faculty Award
 Central nervous system mechanisms of glucose detection: role of the type 2 glucose transporter [GLUT2] in hypoglycemic counterregulation.
 The goal of this project is to employ transgenic mouse models to develop fundamental knowledge regarding the role of GLUT2 in CNS hypoglycemic counterregulation both in vivo and in vitro.
 Role: PI

3. U54 GM104940 Cefalu, W (PI)
 2014 LA CaTS Pilot Grant
 Testing glial pathways to HAAF in human subjects using ¹³C magnetic resonance spectroscopy.
 The major goal of this project is to determining if prolonged fasting in humans leads to alterations in CNS metabolism, as measured by ¹³C magnetic resonance spectroscopy.
 Role: Pilot grant PI

4. 2 P20 RR021945 Gettys, Thomas (PI) 09/04/2006-07/31/2016
 NIH (NCCR) Mentoring Obesity and Diabetes Research in Louisiana (COBRE)
 Role: Project 3 Principal Investigator (07/01/10 – 06/30/2015)
 The specific aims of the COBRE proposal are to: a) expand the critical mass of investigators using cell and molecular approaches in the pursuit of obesity/diabetes research; b) mentor junior faculty displaying great promise; c) implement evaluation criteria for junior investigators; d) foster a collaborative and interactive research environment and e) strengthen the research infrastructure.
 Role: Project PI

5. PBRC NORC Pilot and Feasibility Grant- NORC Center Grant # 2P30DK072476-06
 05/01/2011-04/31/2013
 The Role of Brainstem Astrocytes in the Autonomic Response to Hypoglycemia.
 Focuses on the role of the type 2 glucose transporter in the detection of systemic hypoglycemia by specific brain regions and cell types within the CNS.

6. Predoctoral Fellowship, (T32) NIH Vision Science Training Grant
 (August, 2005 – May, 2008)
 University of Alabama at Birmingham

7. Predoctoral Fellowship, (T32) NIH Neuroscience Training Grant
 (June, 2002 – May, 2005)
 University of Alabama at Birmingham

PUBLICATIONS

Peer Reviewed Journal Articles

1. Gamlin PD, **McDougal DH**, Pokorny J, Smith VC, Yau KW and Dacey DM. (2007) Human and macaque pupil responses driven by melanopsin-containing retinal ganglion cells. *Vision Res* 47, 946-54. PMID: PMC1945238
2. **McDougal DH**, and Gamlin PD. (2010) The influence of intrinsically-photosensitive retinal ganglion cells on the spectral sensitivity and response dynamics of the human pupillary light reflex. *Vision Res.* 50(1):72-87. PMID: PMC2795133
3. Sipe GO, Dearworth J. Jr, Selvarajah BP, Blaum JF, Littlefield TE, Fink DA, Casey CN, and **McDougal DH**, Spectral sensitivity of the photointrinsic iris in the red-eared slider turtle (*trachemys scripta elegans*). *Vision Research*, 2011. 51(1): p. 120-130. PMID: 20951155
4. Rogers RC, **McDougal DH**, and Hermann GE. (2011) Leptin amplifies the action of thyrotropin-releasing hormone in the solitary nucleus: An in vitro calcium imaging study. *Brain Res*, **1385**: p. 47-55. PMID: 21334313
5. **McDougal DH**, Hermann GE, and Rogers RC. (2011) "Vagal afferent stimulation activates astrocytes in the nucleus of the solitary tract via AMPA receptors: evidence of an atypical neural–glial interaction in the brainstem." *The Journal of Neuroscience*, **31**(39): 14037-14045. PMID: 21957265
6. **McDougal DH**, Viard E, et al. (2013). "Astrocytes in the hindbrain detect glucoprivation and regulate gastric motility." *Autonomic Neuroscience* 175(1–2): 61-69. PMID: 23313342
7. **McDougal DH**, Hermann GE, and Rogers RC (2013). "Astrocytes in the nucleus of the solitary tract are activated by low glucose or glucoprivation: evidence for glial involvement in glucose homeostasis." *Frontiers in Neuroscience* 7: 249. PMID: 3868892
8. Barnes MJ, and **McDougal DH** (2014). "Leptin into the rostral ventral lateral medulla (RVLM) augments renal sympathetic nerve activity and blood pressure." *Front Neurosci* 8: 232. PMID: 4125949
9. **McDougal DH**, and Gamlin PD (2015). "Autonomic control of the eye." *Comprehensive Physiology* 5(1): 439-473.
10. Hill, CM, Laeger, T, Albarado, DC, **McDougal, DH**, Berthoud, HR, Munzberg, H and Morrison, CD (2017). "Low protein-induced increases in FGF21 drive UCP1-dependent metabolic but not thermoregulatory endpoints." *Scientific reports* 7(1): 8209. PMID: 5557875
11. Rogers RC, **McDougal DH**, and Hermann GE (2017). "Hindbrain astrocyte glucodetectors and counter-regulation ". In: Appetite and Food Intake: Central Control, Second Edition. Boca Raton, FL, 2017 by Taylor & Francis Group, LLC. 205-228.
12. Rogers RC, **McDougal DH**, Ritter S, Qualls-Creekmore E, and Hermann GE (2018). "Response of catecholaminergic neurons in the mouse hindbrain to glucoprivic stimuli is astrocyte dependent." *American journal of physiology. Regulatory, integrative and comparative physiology*.
13. **McDougal DH**, Darpolor MM, DuVall MA, Sutton EF, Morrison CD, Gadde KM, Redman LM and Carmichael OT (2018). "Glial acetate metabolism is increased following a 72-h fast in metabolically healthy men and correlates with susceptibility to hypoglycemia." *Acta diabetologica* 55(10): 1029-1036. PMID: 6153507
14. Hill CM, Qualls-Creekmore E, Berthoud HR, Sot, P, Yu S, **McDougal DH**, Munzberg H, and Morrison CD (2020). "FGF21 and the Physiological Regulation of Macronutrient Preference." *Endocrinology* 161(3). PMID: 7053867
15. Morrison CD, Hill CM, DuVall MA, Coulter CE, Gosey JL, Herrera MJ, Maisano LE, Sikaffy HX and **McDougal DH** (2020). "Consuming a ketogenic diet leads to altered hypoglycemic counter-regulation in mice." *Journal of Diabetes and Its Complications* 34(5): 107557. PMID: 32199771
16. **McDougal, DH**, Marlatt, K, Redman, LM, Beyl, R and Ravussin, E (2020). "A Novel Approach to Assess Metabolic Flexibility Overnight in a Whole-Body Room Calorimeter" *Obesity (Silver Spring)*. 2020 Nov;28(11):2073-2077. doi: 10.1002/oby.22982. PMID: 32985108

Journal Articles currently in review/revision:

1. DuVall, MA, Coulter, CE, Gosey, JL, Herrera, MJ, Hill, CM, Jariwala, RR, Maisano, LE, Moldovan, LA, Morrison, CD, Nwabueze, NV, Sikaffy, HX and **McDougal, DH** (2021). "Leptin treatment prevents impaired hypoglycemic counterregulation induced by exposure to severe caloric restriction or exposure to recurrent hypoglycemia." *Autonomic Neuroscience: Basic and Clinical*. In Review.

2. Cristal M. Hill^{1*}, Diana C. Albarado¹, Lucia Coco¹, Redin A. Spann¹, Emily Qualls-Creekmore¹, Susan J. Burke¹, J. Jason Collier¹, Sangho Yu¹, **David H. McDougal**¹, Hans-Rudolf Berthoud¹, Heike Münzberg¹, Andrzej Bartke², and Christopher D. Morrison (2021). "The extension of lifespan and healthspan by dietary protein restriction requires FGF21. *Nature Communications*. In Review.
3. Morrison, CD, DuVall, MA, Hill, CM, Spann, RA, and **McDougal, DH** (2021). "Leptin receptor signaling is required for intact hypoglycemic counterregulation" *The Journal of Diabetes and its Complications*. In Review.
4. de Souza Cordeiro, LM, Brainbridge, LDevisetty, N, **McDougal, DH**, Peters, DJM, and, Chhabra, KH "Lack of renal *Glut2* reverses hyperglycemia and normalizes bodyweight in mouse models of diabetes and obesity" *PNAS*. In Review.

Chapters and Reviews

1. **McDougal, DH** and Gamlin, PDR (2008). "Pupillary Control Pathways". In: The Senses: A Comprehensive Reference. New York, Academic Press. 521-536.
2. Gamlin, PD and **McDougal, DH** (2010). "Pupil". In: Encyclopedia of the Eye Boston, MA, Elsevier. 549-555.

Abstracts and Proceedings

1. Gamlin PD, Smith VC, Dacey DM, Pokorny J, and **McDougal DH**
Melanopsin-containing Retinal Ganglion Cells Drive the Pupillary Light Reflex in the Primate Invest. *Ophthalmol. Vis. Sci.* 2004 45: E-Abstract 2262
2. **McDougal DH**, Gamlin PD. Intrinsically-Photoreceptive Retinal Ganglion Cells Drive the Paradoxical Pupil Response in Primates. Program No. 408.3. *2004 Abstract Viewer/Itinerary Planner*. San Diego, CA: Society for Neuroscience, 2004. Online.
3. **McDougal DH**, Gamlin PD. Human Pupil Responses Driven by Melanopsin-Containing Retinal Ganglion Cells. Program No. 240.17. *2006 Neuroscience Meeting Planner*. Atlanta, GA: Society for Neuroscience, 2006. Online.
4. **McDougal DH**, Gamlin PD. The Influence of Melanopsin on the Spectral Sensitivity of Human Pupillary Responses to Long Duration Light Stimuli. Program No. 68.23. *2007 Neuroscience Meeting Planner*. San Diego, CA: Society for Neuroscience, 2007. Online.
5. Sipe GO, Dearworth J. Jr, Blaum JF, and **McDougal DH**. Spectral Sensitivity of the Photointrinsic Iris in the Turtle. *IOVS* 2009; 50: E-Abstract 5038.
6. **McDougal DH**, Gamlin PD. The Relative Contribution of Rods, Cones, and Melanopsin to the Human Pupillary Light Reflex. *IOVS* 2009; 50: E-Abstract 3052.
7. **McDougal DH**, Hermann GE, and Rogers RC (2009). In vitro stimulation of vagal afferents activates astrocytes in the nucleus of the solitary tract. Program No. 88.3. *2009 Neuroscience Meeting Planner*. Chicago, IL: Society for Neuroscience, Online.
8. **McDougal DH**, Hermann GE, and Rogers RC. (2010) Glucosensitive astrocytes in the nucleus of the solitary tract. Program No. 91.23. *2010 Neuroscience Meeting Planner*. San Diego, CA: Society for Neuroscience, 2010. Online.
9. **McDougal DH**, Hermann GE, and Rogers RC. (2011) "Astrocytes in the Nucleus of the Solitary Tract Actively Signal during Low Glucose Availability." *Diabetes* **60**(Supplement 1): A134.
10. **McDougal DH**, Rogers RC, and Hermann GE. (2011). "Astrocytes in rat nucleus of the solitary tract are activated by low glucose or glucoprivic challenges." *Autonomic neuroscience : basic & clinical* **163**(1): 76
11. **McDougal DH**, Rogers RC, and Hermann GE. Astrocytes as glucosensors in the solitary nucleus. (2012) Program No. 901.03. *2012 Neuroscience Meeting Planner*. New Orleans, LA: Society for Neuroscience
12. **McDougal DH** and Morrison CD. (2015). "Astrocyte-specific disruption of GLUT2 alters the response to systemic glucoprivia." *Diabetes* **64** (Supplement 1).
13. **McDougal DH** (2018). "Acute caloric restriction leads to loss of hypoglycemic counter-regulation in mice following short-term refeeding." *Diabetes* **67** (Supplement 1).
14. Hill CM, Dehner MV, **McDougal DH**, Berthoud H-R, Muenzberg, H and Morrison, CD (2018). "Neuronal FGF-21 Signaling—A Sensor of Dietary Protein Restriction." *Diabetes* **67**(Supplement 1): 261-LB.

15. Rogers RC, **McDougal DH**, Ritter S, Qualls-Creekmore E and Herman, GE (2018). "Glucoprivic sensitivity of hindbrain catecholamine neurons is astrocyte-dependent." *The FASEB Journal* 32(1_supplement): 738.732-738.732.
16. DuVall MA, Coulter CE, Hill CM, Morrison CD, Sikaffy HX, and **McDougal DH** (2019). "386-P: Chronic and Acute Consumption of a Ketogenic Diet Leads to Deficits in Hypoglycemic Counterregulation in Mice." *Diabetes* 68(Supplement 1): 386-P.
17. **McDougal DH**, Marlatt KL, Redman LM, Beyl RA, and Ravussin E. (2019) "A Novel Approach to Assess Metabolic Flexibility in a Respiratory Chamber" *The Obesity Society*; Abstract T-P-LB-3614
18. **McDougal DH** (2019). "Evaluation of the association between glial acetate metabolism and the susceptibility to insulin-induced hypoglycemia." *The Association of Clinical and Translational Science*, Washington DC, Abstract
19. **McDougal DH**, DuVall MA, Morrison CD, Moldovan LA, Jariwala R, (2020). "Leptin supplementation prevents the loss of hypoglycemia-induced glucagon release following exposure to six days of severe caloric restriction in mice." *The Association of Clinical and Translational Science*, Washington DC, Abstract 4447
20. **McDougal, DH**, DuVall, MA, Sikaffy, HX, Jariwala, R, Morrison, CD and Hill, CM (2020). "13-LB: Leptin Treatment Prevents Impaired Hypoglycemic Counterregulation Induced by Exposure to Recurrent Hypoglycemia or Caloric Restriction." *Diabetes* 69(Supplement 1): 13-LB.
21. de Souza Cordeiro, LM, Devisetty, N, **McDougal, DH**, Peters, DJM, and, Chhabra, KH "Loss of function of kidney-specific GLUT2 blunts hyperglycemia by elevating glycosuria in a mouse model of diabetes". *Experimental Biology* 2021
22. de Souza Cordeiro, LM, Devisetty, N, **McDougal, DH**, Peters, DJM, and, Chhabra, KH "Renal GLUT2 is essential in regulating systemic glucose homeostasis by glycosuria." *The Endocrine Society meeting* 2021

INVITED TALKS

- Oct, 2015 Invited Speaker "The Role of Astrocytes in the CNS Response to Hypoglycemia." Department of Biology, Lafayette University, Easton, Pennsylvania
- June, 2017 Invited Speaker "Role of Astrocytes in the Central Nervous System Response to Hypoglycemia." American Diabetes Association's 77th Scientific Sessions, San Diego CA

SERVICE

Ad Hoc Manuscript Reviewer

American Journal of Physiology

Journal of the Optical Society of America

International Journal of Obesity

Journal of Obesity

Journal of Neurophysiology

Current Diabetes Reviews

Obesity

Journal of Physiology-Endocrinology and Metabolism

Ad Hoc Grant Reviewer

Louisiana Biomedical Research Network

UAB Center for Clinical and Translational Science (CCTS) Pilot Program

TEACHING AND MENTORING

Graduate Level

Lecturer

NFS (HUEC) 7004 Molecular and Clinical Nutrition

LSU School of Nutrition and Food Sciences

Pennington Biomedical Research Center/LSU
 Baton Rouge, Louisiana
 Fall 2016, 2017, 2019

Faculty

NEUR 704, Introduction to Neurobiology
 Department of Neurobiology
 Dauphin Island Sea Lab / University of Alabama at Birmingham
 Mobile, Alabama / Birmingham, Alabama
 Summer 2010, 2011

Laboratory Coordinator

NEUR 704, Introduction to Neurobiology
 Department of Neurobiology
 Dauphin Island Sea Lab / University of Alabama at Birmingham
 Mobile, Alabama / Birmingham, Alabama
 Summer 2009

Lecturer

NEUR 704, Introduction to Neurobiology
 Department of Neurobiology
 Dauphin Island Sea Lab / University of Alabama at Birmingham
 Mobile, Alabama / Birmingham, Alabama
 Summer 2006, 2009, 2010, 2011

Teaching Assistant

NEUR 704, Introduction to Neurobiology
 Department of Neurobiology
 Dauphin Island Sea Lab / University of Alabama at Birmingham
 Summer 2003, 2004, 2005 and 2006

Undergraduate level

Teaching Assistant
 CH 462, Biochemistry II
 Department of Chemistry
 University of Alabama at Birmingham
 Spring 2003

Lecturer

CH 461, Biochemistry I
 Department of Chemistry
 University of Alabama at Birmingham
 Fall 2003

Teaching Assistant

CH 461, Biochemistry I