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## **Danielle M. Osborne, Ph.D.**

Assistant Scientist  
Legacy Research Institute  
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### **Education**

- Ph.D. Behavioral Neuroscience 2014  
State University of New York at Albany, Albany, NY
- B.S. Psychology and Biology 2007  
Western Oregon University, Monmouth, OR

### **Manuscripts (\* corresponding author)**

<https://www.ncbi.nlm.nih.gov/myncbi/1zs0doCQ3a8ka/bibliography/public/>

### **Submitted or in preparation**

Dorn, A.D., Baer, S.D., **Osborne, D.M.\*** (In preparation). Folliculin manipulation in the dorsal hippocampus sex-specifically affects learning and autophagic-lysosomal signaling and genes in C57BL/6 and 5xFAD mice.

### **Published Manuscripts**

13. Baer, S.B., Dorn, A.D., **Osborne, D.M.\*** (2024). Sex differences in response to obesity and caloric restriction on cognition and hippocampal measures of autophagic-lysosomal transcripts and signaling pathways. *BMC Neuroscience*, 25:1. DIO: 10.1186/s12868-023-00840-1
12. Vander Velden, J.W., **Osborne, D.M.\*** (2022). Prolonged diet-induced obesity modifies DNA methylation and gene expression in the hippocampus. *Neuroscience Letters*. May 29;780:136656. DOI: 10.1016/j.neulet.2022.136656.
11. Vander Velden, J.W., **Osborne, D.M.\***, (2021). Obesity prevents S-adenosylmethionine-mediated improvements in age-related peripheral and hippocampal outcomes. *Nutrients*. 13(4), 1201. DOI:10.3390/nu13041201
10. **Osborne, D.M.\***, Sandau, U.S., Jones, A.T., Vander Velden, J.W., Weingarten, A.M., Etesami, N., Huo, Y., Shen, H.Y., Boison, D., (2018). Developmental role of adenosine kinase for the expression of sex-dependent neuropsychiatric behavior. *Neuropharmacology*. 141, 89-97. DOI: 10.1016/j.neuropharm.2018.08.025
9. **Osborne, D.M.**, O'Leary, K.E., Fitzgerald, D.P., George, A.J., Vidal, M.M., Anderson, B.M, McNay, E.C., (2017). Context-dependent memory following recurrent hypoglycaemia in non-diabetic rats is mediated via glucocorticoid signalling in the dorsal hippocampus. *Diabetologia*. 60(1):182-191. DOI: 10.1007/s00125-016-4114-1
8. Toti, K.S., **Osborne, D.M.**, Ciancetta, A., Boison, D., Jacobson, K.A., (2016). South (S)- and North (N)-Methanocarpa-7-Deazaadenosine Analogues as Inhibitors of Human Adenosine Kinase. *Journal of Medicinal Chemistry*. 59, 6860-6877. DOI: 10.1021/acs.jmedchem.6b00689

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7. **Osborne, D.M.**, Fitzgerald, D.P., O’Leary, K.E., Anderson, B.M., Lee, C.C., Tessier, P.M. McNay, E.C., (2016). Intrahippocampal administration of a domain antibody that binds aggregated amyloid- $\beta$  reverses cognitive deficits produced by diet-induced obesity. *Biochimica et Biophysica Acta*, 1860, 1291-1298. DOI: 10.1016/j.bbagen.2016.03.005
  - a. “Eating your Way to Dementia: The link between obesity and dementia is becoming hard to deny.” *New Scientist: Special Report/Brain Diabetes*. November 30, 2013, Issue 2945.
6. Pearson-Leary, J., **Osborne, D.M.**, McNay, E.C., (2016). Role of glia in stress-induced enhancement and impairment of memory. *Frontiers of Integrative Neuroscience*. 9:63. DOI: 10.3389/fnint.2015.00063.
5. **Osborne, D.M.**, Pearson-Leary, J., McNay, E.C., (2015). The Neuroenergetics of Stress Hormones in the Hippocampus and Implications for Memory. *Frontiers in Neuroscience*. 9:164. DOI: 10.3389/fnins.2015.00164.
4. Frye, C.A., Paris, J.J., **Osborne, D.M.**, Campbell, J.C., Kippin, T.E., (2011). Prenatal Stress Alters Progesterone to Mediate Susceptibility to Sex-Typical, Stress-Sensitive Disorders, such as Drug Abuse: A Review. *Frontiers in Child and Neurodevelopmental Psychiatry. Front Psychiatry*, 2, 52. DOI: 10.3389/fpsyt.2011.00052
3. **Osborne, D.M.**, Frye, C.A. (2009). Estrogen increases latencies to seizures and levels of 5 $\alpha$ -pregnan-3 $\alpha$ -ol-20-one in hippocampus of wild-type, but not 5 $\alpha$ -reductase knockout, mice. *Epilepsy and Behavior*, 16, 411-414. DOI: 10.1016/j.yebeh.2009.08.016
2. **Osborne, D.M.**, Edinger, K.L., Frye, C.A., (2009). Chronic administration of androgens with actions at estrogen receptor beta have anti-anxiety and cognitive-enhancing effects in male rats. *Age*, 31, 119-26. DOI: 10.1007/s11357-009-9114-3
1. Frye, C.A., Koonce, C, Edinger, K.L., **Osborne, D.M.**, Walf, A.A., (2008). Androgens with activity at estrogen receptor beta have cognitive-enhancing and anti-anxiety effects in male rats and mice. *Hormones and Behavior* 54(5), 726-34. DOI: 10.1016/j.yhbeh.2008.07.013

### **Grant Funding:**

Legacy Research Foundation (PI: Osborne) 04/01/2023-03/31/26

“Menopause, obesity, and Alzheimer’s Disease”

This research will examine the impact of menopause on obesity outcomes in relation to Alzheimer’s Disease

Role: Principal Investigator

Oregon Partnership for Alzheimer’s Research (PI: Osborne) 06/01/2022-5/31/2024

“Lysosomes at the Crossroads of obesity and Alzheimer’s Disease”

Seeking to ameliorate obesity exacerbation of Alzheimer’s Disease via upregulation of autophagy-lysosomal pathways

Role: Principal Investigator

Legacy Research Foundation (PI: Osborne) 04/01/2020-03/31/23

“Role of Folliculin in the Brain”

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This research characterizes the role of folliculin in the hippocampus in mouse models of Alzheimer's Disease and Type 2 Diabetes

Role: Principal Investigator

Legacy Research Foundation (PI: Osborne)

04/01/2017-03/31/20

“Reduction of stroke vulnerability in Type 2 Diabetes”

This project examined the role of metabolic dysfunction in the brain in increasing susceptibility to neurological disease via epigenetic factors.

Role: Principal Investigator

Legacy Research Foundation (Co-PI: Osborne)

04/01/2016-03/31/18

“ADK Therapy to Prevent Epilepsy”

This project continues our work to use novel adenosine kinase-related therapies to prevent the development of epilepsy as well as treat existing epilepsy disorders.

Role: Co-Principal Investigator

### **Oral Presentations**

9. **Osborne, D.M.**, Dorn, A.D., (2024). Effects of TFEB gene therapy on hippocampal-dependent learning and molecular signaling in obese female and male 5xFAD mice. *OR/SW Society for Neuroscience Meeting*, Troutdale, OR.
8. **Osborne, D.M.**, Dorn, A.D., Guvenir, A. (2023). Folliculin manipulation in the dorsal hippocampus sex-specifically affects learning and autophagic-lysosomal signaling and genes in C57BL/6 and 5xFAD mice. *The 52<sup>nd</sup> Annual Society for Neuroscience Meeting*, Washington D.C.
7. **Osborne, D.M.**, Vander Velden, J.W., (2018). A role for altered DNA methylation in mediating high-fat diet and diabetic effects on hippocampal neurodegeneration. *The 48<sup>th</sup> Annual Society for Neuroscience Meeting*, San Diego, CA.
6. **Osborne, D.M.**, McNay, E.C., (2013). Altered glucocorticoid signaling mediates the impact of recurrent hypoglycemia on hippocampal cognitive and neural function. *The 43rd Annual Society for Neuroscience Meeting*, San Diego, CA.
5. McNay, E.C., **Osborne, D.M.**, Fitzgerald, D.P., Anderson, B.M., Tessier, P.M. (2013). Antibodies specific for toxic aggregates of Amyloid beta attenuate cognitive deficits produced by a high fat diet. *The 43rd Annual Society for Neuroscience Meeting*, San Diego, CA
4. **Osborne, D.M.**, DaCosta, D.D., (2011). Getting into Graduate/Medical School. Presented at the 20<sup>th</sup> N.E.U.R.O.N. Conference in New York, NY.
3. Walf, A., Kohtz, A., **Osborne, D.**, Paris, J., Frye, C., (2010). Impact of environmental stressors on autonomic, neuroendocrine, and affective responding in rats, mice, and people: Implications of epigenetics? Presented at the 18<sup>th</sup> N.E.U.R.O.N. Conference in New York, NY.
2. Gittis, A., **Osborne, D.M.**, Kohtz, A.S., Paris, J.J., Van Dam, N., Frye, C.A. (2010). Brain Awareness and other educational outreach opportunities: Hosting an Interdisciplinary Colloquium. Presented at the 18th N.E.U.R.O.N. Conference in New York, NY.

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1. **Osborne, D.M.**, (2006). Changes in blame placement according to gender. Abstract in the proceedings of the Western Oregon University Academic Excellence Showcase, 1, 25.

### **Research Experience**

Assistant Scientist

June 2023-Present

Legacy Research Institute

- Independent grant submission as Principal Investigator
- Independent investigator in research, presentation, and manuscript publication
- Awardee of foundation grants as Principal Investigator
- National Institute of Aging Butler-Williams Scholar
- Oversight of research team
- IACUC Chair

Associate Staff Scientist

March 2021-June 2023

Legacy Research Institute

- Independent scientific research, presentation, and manuscript publication
- Submission of federal and foundational grants as Principal Investigator
- Oversight, budgetary control, and leadership of small grants as Principal Investigator
- Mentorship of Research Technicians
- IACUC Chair

Assistant Staff Scientist

April 2018-February 2021

Legacy Research Institute

- Independent scientific research, presentation, and manuscript publication
- Oversight and mentorship of Research Assistants/Technicians
- Assistance in Legacy Research Institute strategic planning
- Grant review and budgeting for internal Legacy Foundation applications

Research Associate

April 2017-March 2018

Dow Neurobiology, Legacy Research Institute

- Independent planning, execution, and analysis of experimental research
- Supervision and mentorship of research assistants
- Successful funding of independent Legacy Research Foundation grant

Post-doctoral Fellow

September 2014-March 2017

Dow Neurobiology, Legacy Research Institute

- Independent experimental execution of behavioral and biochemistry endpoints
- Established behavioral protocols
- Supervised and mentored own research assistant

### **Honors:**

NIA Butler-Williams Scholars Program

2023

Graduate Initiative Grant

2012

University Auxiliary Services Grant: Sport-Related Head Trauma Colloquium

2010

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Graduate Student Organization Research Award Grant	2008
Outstanding Psychology Senior	2007
Honor Roll	2004-2007
Phi Kappa Phi Presentation Award	2006
Best Presented Research Project for Research Methods	2004

### Mentoring/Advising

I have provided extensive mentorship to undergraduates and new graduate students in biochemical techniques, animal behavior, proposal reviews, and surgical procedures toward the completion of students' independent research and/or senior thesis projects.

\*\*Advised on Thesis work

<u>Name</u>	<u>Post-Mentoring Education</u>
1. Brian Anderson	Ph.D. Student in Chemistry, UNC-Chapel Hill, NC
2. Sadie Baer	M.S. in Teaching, Pacific University, Forest Grove, OR
3. Dennis Fitzgerald**	Medical Resident, Beth Israel Deaconess, Boston, MA <i>a. Thesis: Caffeine attenuates effects of high fat diet via mTOR interaction</i>
4. Jonathan Friedman	Radiologist, Drexel, Philadelphia, PA
5. Alvin George**	M.D., Thomas Jefferson, Philadelphia, PA <i>a. Honors Thesis: Effects of chronic lipopolysaccharide on hippocampal microglia</i>
6. Ashton Guvenir	West Linn High School, West Linn, OR
7. Abbie Jones	M.S. Computer Science, Software Engineer, Portland, OR
8. Kelsey O'Leary**	Medical Resident, Beth Israel Deaconess, Boston, MA <i>a. Honors Thesis: Peripheral resveratrol enhances hippocampal physiology and behavior</i>
9. Brittany Stebbins**	Masters in Speech and Language Pathology, Touro University <i>a. Thesis: Role of testosterone's metabolites in reducing depressive-like behavior</i>
10. Jacob Vander Velden	M.S. in Neuroscience, Georgia State University, GA
11. Mayadah Yehya	D.O. Illinois College of Optometry, Chicago, IL

### Poster Presentations

36. Baer, S.B., Dorn, A.D., **Osborne, D.M.**, (2022). Long-term obesity produces sex-specific changes to hippocampal autophagy and lysosomal proteins and cognitive behavior. *The 52<sup>nd</sup> Annual Society for Neuroscience Meeting, San Diego, CA*
35. **Osborne, D.M.**, Vander Velden, J.W. (2019). Long-term high-fat diet changes DNA methylation resulting in pro-neurodegenerative gene changes in the dorsal hippocampus. *The 49<sup>th</sup> Annual Society for Neuroscience Meeting, Chicago, IL.*
34. **Osborne, D.M.**, Sandau, U., Jones, A.J., Etesami, N., Yaheda, M., Boison, D., (2016). Adenosine degradation during gestation prevents maladaptive epigenetic changes and behaviors associated with the prenatal infection model of schizophrenia. *The 46<sup>th</sup> Annual Society for Neuroscience Meeting, San Diego, CA.*
33. McNay, E.C., **Osborne, D.M.**, (2015). The cognitive and neural impact of recurrent hypoglycemia is mediated by glucocorticoids in the hippocampus. *The 45<sup>th</sup> Annual Society for Neuroscience Meeting, Chicago, IL.*

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32. **Osborne, D.M.**, McNay, E.C., (2013). Interactions between Glucocorticoid Signaling and Insulin Mediate the Impact of Recurrent Hypoglycemia on Hippocampal Function. *American Diabetes Association's 73rd Scientific Sessions*, Chicago, IL.
31. **Osborne, D.M.**, Marchinek, A., Santa Croce, A., McNay, E.C., (2012). Glucocorticoid mediated changes in hippocampal metabolism: Effect of recurrent hypoglycemia and impact on cognitive performance. *The 42<sup>nd</sup> Annual Society for Neuroscience Meeting*, New Orleans, LA.
30. **Osborne, D.M.**, Pearson-Leary, J., McNay, E.C., (2012). Interplay between insulin and stress hormones on glucose metabolism in hippocampal neurons. *Stress and Cognition*, Ascona, Switzerland
29. **Osborne, D.M.**, Frye, C.A., (2011). Effects and mechanisms of allopregnanolone in mediating cognition among male and female mice. *The 41<sup>st</sup> Annual Society for Neuroscience*, Washington D.C.
28. **Osborne, D.M.**, Frye, C.A. (2010). Some of testosterone's effects to protect against scopolamine-induced memory impairment in male mice may involve 5alpha-reduction. *19<sup>th</sup> Annual New England Conference of N.E.U.R.O.N., Quinnipiac University*, Hamden, CT.
27. Edinger, K.L., Kohtz, A.S., **Osborne, D.M.**, Llaneza, D.C., daCosta, D.J., Koonce, C.J., Paris, J.J., Walf, A.A., Frye, C.A. (2010). Effects of environmental stress and enrichment on autonomic, neuroendocrine, and depression-like status among male and female rats and mice. *19<sup>th</sup> Annual New England Conference of N.E.U.R.O.N., Quinnipiac University*, Hamden, CT.
26. Friedman, J.A., **Osborne, D.M.**, Frye, C.A. (2010). Phenytoin reduced sexual behavior, and increased latencies to chemoconvulsant-induced mortality, among 5alpha-reductase knockout, male mice. *19<sup>th</sup> Annual New England Conference of N.E.U.R.O.N., Quinnipiac University*, Hamden, CT.
25. **Osborne, D.M.**, Frye, C.A. (2010). Some of testosterone's effects to protect against scopolamine-induced memory impairment in male mice may involve 5alpha-reduction. *40<sup>th</sup> Annual Society for Neuroscience Meeting*, San Diego, CA.
24. **Osborne, D.M.**, Crowley C., Frye, C.A. (2010). Education on sports-related head trauma colloquium: an event to bridge athletics and psychology. *40<sup>th</sup> Annual Society for Neuroscience Meeting*, San Diego, CA.
23. Friedman, J.A., **Osborne, D.M.**, Frye, C.A. (2010). Phenytoin reduced sexual behavior, and increased latencies to chemoconvulsant-induced mortality, among 5alpha-reductase replete, but not 5alpha-reductase knockout, male mice. *40<sup>th</sup> Annual Society for Neuroscience Meeting*, San Diego, CA.
22. Edinger, K.L., Kohtz, A.S., **Osborne, D.M.**, Llaneza, D.C., daCosta, D.J., Koonce, C.J., Paris, J.J., Walf, A.A., Frye, C.A. (2010). Effects of environmental stress and enrichment on autonomic, neuroendocrine, and depression-like status among male and female rats and mice. *40<sup>th</sup> Annual Society for Neuroscience Meeting*, San Diego, CA.
21. Walf, A.A., Torgersen J., **Osborne, D.M.**, Paris, J.J., Young, J., Frye, C.A. (2010). The 18<sup>th</sup> Northeast Under/graduate Research Organization for Neuroscience (N.E.U.R.O.N.): 6<sup>th</sup> meeting in New York City. *40<sup>th</sup> Annual Society for Neuroscience Meeting*, San Diego, CA.
20. Delprino, A.M., Tedeschi, D., **Osborne, D.M.**, Llaneza, D.C., Frye, C.A. (2010). Abnormal affective behaviors of autistic-like mice may be related to differences in progesterone levels when compared to controls. *18<sup>th</sup> Annual New England Conference of N.E.U.R.O.N., Hunter College*, New York, NY.

19. **Osborne, D.M.**, Freidman, J., Frye, C.A. (2010). Phenytoin increased latencies to PTZ induced death but reduced anogenital investigation among wildtype but not  $5\alpha$ -reductase mice. *18th New England Conference of N.E.U.R.O.N., Hunter College, New York, NY.*
18. Tedeschi, D., Delprino, A.M., **Osborne, D.M.**, Llana, D.C., Frye, C.A. (2010). Altered social preference behaviors of autistic-like mice compared to controls may be related to progesterone levels. *18th New England Conference of N.E.U.R.O.N., Hunter College, New York, NY.*
17. **Osborne, D.M.**, Paris, J.J., Ramos-Goyette, S., Young, J., Frye, C.A. (2009). 16th Annual Northeast Under/Graduate Research Organization for Neuroscience (N.E.U.R.O.N.). Poster presented at the Society for Neuroscience 2009 Meeting, Chicago, IL.
16. **Osborne, D.M.**, Walf, A.A., Frye, C.A. Strain differences in dose-dependent effects of estradiol for anxiety, cognitive, sexual and depressive behaviors in mice. Poster presented at the Society for Neuroscience 2009 Meeting, Chicago, IL.
14. Edinger, K.L., Walf, A.A., Paris, J.J., **Osborne, D.M.**, Frye, C.A. Conjugated equine estrogens and/or medroxyprogesterone acetate decrease anxiety-like behavior of middle-aged rats, depending upon status of ovarian function. Poster presented at the Society for Neuroscience 2009 Meeting, Chicago, IL.
13. **Osborne, D.M.** Walf, A.A., Frye, C.A. (2009). Strain differences in dose-dependent effects of estradiol for anxiety, cognitive, sexual and depressive behaviors in mice. *17th annual meeting of the Northeast Under/graduate Research Organization for Neuroscience, Boston, MA.*
12. **Osborne, D.M.**, Frye, C.A., (2009). Estrogen can effect testosterone's  $5\alpha$ -reduced metabolites to prevent scopolamine-induced memory impairment in males. Poster presented at the Organization for the Study of Sex Differences Conference, Toronto, Ontario, Canada.
11. **Osborne, D.M.**, Frye, C.A., (2009). Parity and age can interact to affect allopregnanolone levels to have subsequent effects on cognitive performance. Presented at the N.E.U.R.O.N. Conference, New York, NY.
10. **Osborne, D.M.**, Frye, C.A., (2009). Natural fluctuations in progestins across the female lifespan may affect cognition. Poster presented at the Steroids and the Nervous System Conference, Turino, Italy.
9. **Osborne, D.M.**, Walf, A.A., Edinger, K., Koonce, C.K., Frye, C.A. (2008). Administration of androgens with actions at estrogen receptor beta have anti-anxiety, and cognitive enhancing effects. Poster presented at the Society for Neuroscience Meeting, Washington, D.C.
8. **Osborne, D.M.**, Koonce, C.J., Walf, A.A., Espallergues, J., Maurice, T., Frye, C.A. Anti-depressive effects of the  $3\beta$ -hydroxysteroid dehydrogenase inhibitor, trilostane, are observed in wildtype, but not estrogen receptor beta knockout, mice. Presented at the Society for Neuroscience 2008 Meeting, Washington, D.C.
7. **Osborne, D.M.**, Walf, A.A., Edinger, K., Koonce, C.K., Frye, C.A. (2008). Androgens with effects at estrogen receptor beta have anti-anxiety and cognitive-enhancing effects. Poster presented at National Institute of Health Day, Albany, NY
6. **Osborne, D.M.**, Frye, C.A. (2008). Anti-seizure effects of estrogen may occur through promoting the production of  $3\alpha,5\alpha$ -THP in the hippocampus. Poster presented at the Conversations in the Capitol District Meeting, Albany, NY.

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5. **Osborne, D.M.**, Frye, C.A. (2008). Estrogen may have anti-seizure effects by elevating allopregnanolone levels in the hippocampus. Poster presented at the N.E.U.R.O.N. conference, Boston, MA
4. Koonce C.J., **Osborne, D.M.**, Frye, C.A., (2007).  $3\alpha,5\alpha$ -THP's role in the facilitation of lordosis in mice. Poster presented at N.E.U.R.O.N. Conference, Boston, MA.
3. **Osborne, D.M.**, Ryals, A., Valdez, N., Hernandez, A., Lima, D., Schmidt, K., & Alexander, J. (2007) Behavioral and electrophysiological evidence for the effects of a writing training task on ability and writer self-efficacy. Poster presented at Western Psychology Association Conference, Vancouver, B.C.
2. **Osborne, D.M.**, Ryals, A., Valdez, N., Hernandez, A., Lima, D., Schmidt, K., & Alexander, J. (2007) Behavioral and electrophysiological evidence for the effects of a writing training task on ability and writer self-efficacy. Abstract in the proceedings of the 65<sup>th</sup> Annual Oregon Academy of Sciences Meeting, 65, 26.
1. Alexander, J., Ryals, A.J., **Osborne, D.M.** (2006) Increased P300 event-related potential amplitude during self-evaluation task: a replication. Poster presented at the Toward a Science of Consciousness, Tucson, AZ.

### **Courses Taught**

Behavioral Neuroscience (Apsy 214)  
Introduction to Psychology (Apsy 202)  
Introduction to Psychology (Apsy 201)

### **Professional Memberships:**

Molecular and Cellular Cognitive Society	2012-present
European Brain and Behavior Society	2012-present
APA member	2010-present
Psi Chi National Honor Society	2009-present
Society for Neuroscience	2008-present