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Executive Summary

My long-term goal is to advance our understanding of how neural circuits and genes function to encode memories, modify or forget them, and, ultimately, how their dysfunction gives rise to human disease. As a graduate student at Baylor College of Medicine in the laboratory of Dr. Ron Davis I uncovered a novel biological pathway, including specific dopamine neurons and dopamine receptors that control forgetting of odor memories. This fundamental discovery, published in *Neuron*, opened a new niche in the field and generated many interesting avenues of research. As a postdoc and staff scientist in the Davis laboratory at Scripps Research Institute Florida I expanded this work and made two more novel discoveries; that forgetting is regulated by sleep and arousal via modulation of dopamine forgetting circuits, published in *Cell*, and that dopamine mediates changes to a memory retrieval circuitry during learning and how these changes are reversed during dopamine mediated forgetting, published in *Cell Reports*. Currently, as an Assistant Professor at the University of Alberta, I am leading a research group that is focused on how gene networks and neural circuits modulate memories using the fruit fly, *Drosophila Melanogaster*. We are particularly interested in characterizing protein networks that interact with two dopamine receptors that are critical players in memory synapses to either build memories during learning or suppress and weaken memories during forgetting. My laboratory takes an interdisciplinary and cutting-edge approach, combining animal behavior, neurogenetics, in vivo functional imaging of neuronal physiology, and advanced proteomics to address these questions.

Academic positions

Assistant Professor , University of Alberta, AB	2020 - <i>present</i>
Senior Staff Scientist , Scripps Research Institute, FL.	2019 – 2020
Postdoctoral Associate , Scripps Research Institute, FL.	2012 – 2019

Education

Ph.D. Developmental Biology, Baylor College of Medicine, TX. Advisor: Ronald L. Davis Thesis: Neuronal circuits underlying the forgetting and expression of olfactory memories in <i>Drosophila</i>	2006 – 2012
B.Sc. Physics, Computational option, University of Texas, TX.	1997 – 2002

Publications

Peer reviewed:

1. Martin-Sabandal J, **Berry JA**, and Davis RL (2020). "Dopamine-based mechanism for transient forgetting", Nature (in revision).
2. Phan A, Thomas CI, Chakraborty M, **Berry JA**, Kamasawa N, Davis RL (2019). "Stromalin limits memory acquisition by developmentally constraining synaptic vesicle pool size", Neuron 101: 103-118.
3. **Berry JA**, Phan A, Davis RL (2018). "Dopamine neurons mediate learning and forgetting through bidirectional modulation of a memory trace", Cell Rep 25: 651-662.
4. Ziegler-Himmelreich* S, Masuho* I, **Berry JA**, MacMullen C, Skamangas NK, Martemyanov KA, Davis RL (2017). "Dopamine receptor DAMB signals via Gq to mediate forgetting in *Drosophila*", Cell Rep 21: 2074-2081.
5. ***Berry JA**, Cervantes-Sandoval I, Chakraborty M, Davis RL (2015). "Sleep facilitates memory by blocking dopamine neuron-mediated forgetting", Cell 161: 1656-1667.
(*) Comment in:
Rihel J, Bendor D (2015). "Flies sleep on it, or Fugeddaboudit!", Cell 161: 1498-1500
Whalley K (2015). "Sleep: Don't forget.", Nat Rev Neurosci 16: 442-443.
6. Cervantes-Sandoval I, Martin-Pena A, **Berry JA**, Davis RL (2013). "System-like consolidation of olfactory memories in *Drosophila*", Journal of Neuroscience 33: 9846-54.
7. **Berry JA**, Cervantes-Sandoval I, Nicholas EP, Davis RL (2012). "Dopamine is required for learning and forgetting in *Drosophila*", Neuron 74: 530-42.
8. Singh B, Cook KR, Vincent L, Hall CS, **Berry JA**, Multani AS, Lucci A (2008). "Cyclooxygenase-2 induces genomic instability, BCL2 expression, doxorubicin resistance, and altered cancer-initiating cell phenotype in MCF7 breast cancer cells", J Surg Res 147(2): 240-6.
9. Singh B, Vincent L, **Berry JA**, Multani AS, Lucci A (2007). "Cyclooxygenase-2 expression induces genomic instability in MCF10A breast epithelial cells", J Surg Res 140(2): 220-6.
10. Singh B, **Berry JA**, Shoher A, Ayers GD, Wei C, Lucci A (2007). "COX-2 involvement in breast cancer metastasis to bone", Oncogene 26(26): 3789-96.
11. Singh B, **Berry JA**, Vincent LE, Lucci A (2006) "Involvement of IL-8 in COX-2-mediated bone metastases from breast cancer", J Surg Res 134(1): 44-51.
12. Singh B, **Berry JA**, Shoher A, Lucci A (2006) "COX-2 induces IL-11 production in human breast cancer cells", J Surg Res 131(2): 267-75.
13. Singh B, **Berry JA**, Shoher A, Ramakrishnan V, Lucci A (2005) "COX-2 overexpression increases motility and invasion of breast cancer cells", Int J Oncol 26(5): 1393-9.

Reviews and book chapters

14. **Berry JA** and Davis RL (2014). "Active forgetting of olfactory memories in *Drosophila*", Prog Brain Res 208: 39-62.
15. **Berry J**, Krause WC, Davis RL (2008). "Olfactory memory traces in *Drosophila*", Prog Brain Res 169: 293-304.

Teaching & Mentoring Experience

- Mentored high school student William Gao, awarded the Kenan Fellowship for the Scripps summer internship program (Summer of 2017). Gained experience in communicating complex behavioral neuroscience research to students, training students to design new cutting edge methodologies, collect and analyze data, and finally, present their scientific findings to the public at the end of the internship.
- Participating in public outreach program entitled "CELLebrate" where I educated people of all age groups at the West Palm Beach Gardens mall on the use of fruit fly research to study genetics, neuroscience, and disease.
- As a senior postdoc in the Davis laboratory, I have mentored and trained three graduate students and three postdocs in *in vivo* functional imaging assays.

Awards and Honors

Reviewer for the Journal of Neurogenetics	2020
Reviewer for the Journal of Neuroscience	2020
Research featured in the magazine <i>The Atlantic</i> , entitled "A Leaky Memory May Be a Good Thing" by Tom Siegfried and Knowable	2019
Reviewer for Proceedings of the National Academy of Sciences of the United States of America	2018
Neuroscience scholar of the Esther B. O'Keefe Charitable Foundation	2017 – 2018
Co-chaired and judged abstracts for the Neurophysiology and Behavior session at the Allied Genetics Conference	2016
Neuroscience scholar of the Esther B. O'Keefe Charitable Foundation	2015 – 2016
Abstract included in Society for Neuroscience "Hot Topics" book	2014
Predoctoral fellowship on Biology of Aging Training Grant	2007 – 2009
Neurobiology of <i>Drosophila</i> course, Cold Spring harbor	2007

Oral Presentations

Berry JA (2019). "Dopaminergic systems underlying forgetting in *Drosophila*". Invited speaker at the Tri-Institutional Postdoctoral Seminar shared between Scripps Research Institute Florida, Max Planck Florida, and Florida Atlantic University, Jupiter, FL.

Berry JA, Phan A, and Davis RL (2017). "Dopamine neurons mediate learning and forgetting through bidirectional modulation of mushroom body output neurons". Nanosymposium, Society for Neuroscience, Washington, DC.

Berry JA, Phan A, and Davis RL (2017). "Dopamine neurons mediate learning and forgetting through bidirectional modulation of mushroom body output neurons". Neuroscience Departmental Seminar, Scripps Research Institute, FL.

Berry JA, Cervantes-Sandoval I, Chakraborty M, Davis RL (2014). "Sleep facilitates memory by blocking dopamine neuron-mediated forgetting". Nanosymposium, Society for Neuroscience, Washington, DC.

Berry JA, Cervantes-Sandoval I, Chakraborty M, Davis RL (2014). "Sleep facilitates memory by blocking dopamine neuron-mediated forgetting". Neuroscience Departmental Seminar, Scripps Research Institute, FL.

Berry JA, Cervantes-Sandoval I, Nicholas EP, Davis RL (2012). "Dopamine is required for learning and forgetting in *Drosophila*". Flies on the beach meeting. Miami, FL.

Berry JA, Cervantes-Sandoval I, Nicholas EP, Davis RL (2011). "Dopamine is required for learning and forgetting in *Drosophila*". Neuroscience Departmental Seminar, Scripps Research Institute, Jupiter, FL.

Berry JA and Davis RL (2009). "Requirement of Dorsal Paired Medial Neurons for Consolidation of Long-term Aversive Olfactory Memory in *Drosophila*". Developmental Biology Retreat, Houston, Tx.

Poster Presentations

Berry JA and Davis RL (2019). "Deciphering how dopaminergic signaling drives learning and forgetting". Canadian *Drosophila* Research Conference (CANfly), Toronto, Ontario.

Berry JA, Phan A, and Davis RL (2018). "Dopamine neurons mediate learning and forgetting through bidirectional modulation of output neuron synapses". Flies on the Beach, Florida International University, Miami, FL.

Berry JA, Phan A, and Davis RL (2018). "Dopamine neurons mediate learning and forgetting through bidirectional modulation of output neuron synapses". International Conference on Learning and Memory, Irvine, CA.

Berry JA and Davis RL (2017). "Dopaminergic modulation of output neuron plasticity during learning and forgetting". Flies on the Beach, Jupiter, FL.

Berry JA and Davis RL (2017). "Dopaminergic modulation of output neuron plasticity during learning and forgetting". Janelia Mushroom Body conference, Ashburn, VA.

Berry JA and Davis RL (2017). "Dopaminergic modulation of output neuron plasticity during learning and forgetting". Max Planck Sunposium, West Palm Beach, FL.

Berry JA and Davis RL (2016). "Dopaminergic modulation of output neuron plasticity during learning and forgetting". Synapse, Jupiter, FL.

Berry JA, Cervantes-Sandoval I, Chakraborty M, Davis RL (2016). "Sleep facilitates memory by blocking dopamine neuron-mediated forgetting". Allied Genetics Conference, Orlando, FL.

Berry JA, Cervantes-Sandoval I, Chakraborty M, Davis RL (2015). "Sleep facilitates memory by blocking dopamine neuron-mediated forgetting". Max Plank Sunposium, Palm Beach Gardens, FL.

Berry JA, Cervantes-Sandoval I, Nicholas EP, Davis RL (2013). "Dopamine is required for learning and forgetting in *Drosophila*". Max Plank Sunposium, West Palm Beach, FL.

Berry JA, Cervantes-Sandoval I, Nicholas EP, Davis RL (2012). "Dopamine is required for learning and forgetting in *Drosophila*". Society for Neuroscience, New Orleans, LA.

Berry JA, Cervantes-Sandoval I, Nicholas EP, Davis RL (2012). "Dopamine is required for learning and forgetting in *Drosophila*". Max Plank Neural Circuits Symposium, Jupiter, FL.

Berry JA, Cervantes-Sandoval I, Nicholas EP, Davis RL (2011). "Dopamine is required for learning and forgetting in *Drosophila*". Society for Neuroscience, Washington, DC.

Berry JA and Davis RL (2009). "Requirement of Dorsal Paired Medial Neurons for Consolidation of Long-term Aversive Olfactory Memory in *Drosophila*". Drosophila Research Conference, Chicago, IL.

Berry JA and Davis RL (2009). "Requirement of Dorsal Paired Medial Neurons for Consolidation of Long-term Aversive Olfactory Memory in *Drosophila*". Baylor College of Medicine Neuroscience Retreat, Houston, TX.

Berry JA and Davis RL (2008). "Requirement of Dorsal Paired Medial Neurons for Consolidation of Long-term Aversive Olfactory Memory in *Drosophila*". Baylor College of Medicine Graduate School Symposium, Houston, TX.