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PRIZE FOR NEURO BIOLOGY

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USA

2021 Winner: Amber L. Alhadeff, Ph.D.

Amber L. Alhadeff received her bachelor degree and Ph.D. from the University of Pennsylvania, where she worked with Harvey Grill and Matthew Hayes to investigate the effects of hindbrain neuroendocrine signaling on food intake control. After receiving her Ph.D., Dr. Alhadeff joined the laboratory of Dr. J. Nicholas Betley at Penn where she explored hypothalamic signaling and its effects on feeding and other survival behaviors. In her lab at the Monell Chemical Senses Center, she is interested in gut-brain signaling pathways underlying motivated behavior, and is passionate about mentorship and facilitating the advancement of diverse and underrepresented scientists.

Interoceptive Sensing and Control of Behavior by Hunger Neurons

Why do we behave differently when we haven't eaten? How do we know when to stop eating? And how do the foods we eat influence our brain activity? Dr. Amber L. Alhadeff began to work on these questions as a postdoc under the mentorship of Dr. J. Nicholas Betley, and in her own lab has continued to investigate how peripheral signals, particularly those arising from the gut, influence neural activity in the brain. To determine how hunger influences perception, Dr. Alhadeff first asked how food deprivation influences responses to sensory stimuli. She discovered that hunger activates a specific population of hypothalamic neurons in the brain to dampen responses to noxious sensory information. This work demonstrated how neural circuits can filter interoceptive information to prioritize hunger – for example, by weakening other signal inputs to enable food seeking. How does information from the gut impact neural activity in these hunger circuits? Dr. Alhadeff's work went on to show that nutrients in the gut rapidly inhibit activity in hypothalamic hunger neurons. Further, different types of food (e.g., fat and sugar) engage different gut-brain pathways to communicate with these neurons. Overall, this work has advanced our understanding of how the brain integrates interoceptive signals to influence our physiology and behavior.

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