The DiPatrizio laboratory is dedicated to elucidating the integrative neurobiology and physiology that controls food reward, sensory processing, and energy balance. A combination of state-of-the-art analytical, surgical, biochemical, molecular, pharmacological, and behavioral tools are employed to achieve these goals. A particular research emphasis is on the lipid messengers, the endocannabinoids, which are proposed “thrifty lipids” that naturally drive the seeking and sensing of energy-rich foods, and the storage of their energy content for future use. For example, gustatory signals from dietary fat drive its intake in mammals, and a portion of our recent work suggests a critical role for gut-brain endocannabinoid signaling in controlling this attraction to fatty foods. These studies reveal that tasting dietary fat stimulates endocannabinoid mobilization in the rodent small intestine through parasympathetic neurotransmission, and this local signaling event provides positive feedback to the brain to promote fat intake and possibly preference for palatable foods. Importantly, this research program examines the molecular and neurobiological underpinnings of obesity and hedonic eating, which are proposed to share many characteristics with addictive and compulsive behaviors. This work will support the discovery and development of novel therapeutic strategies to safely treat obesity, cardiovascular disease, and diabetes.