

Learning from Insect Brains: Explorations of a ‘Simple’ Olfactory System

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The insects are a most speciose, diverse, and successful group of animals, from which much can be learned about the evolution, specialization, operational mechanisms, and adaptedness of neural systems and behavior. As an example of an insect model system, this presentation will highlight investigations of odor-modulated behavior and neural processing of odor mixtures in the experimentally favorable giant sphinx moth *Manduca sexta*. The work to be outlined aims at understanding: (a) the neurobiological mechanisms through which information about olfactory stimuli is encoded, processed, and integrated with inputs of other modalities in the brain; (b) how the innate or learned behavioral significance of an odor is encoded in the brain; and (c) how this odor information ultimately initiates and controls characteristic behavioral responses. Progress through a multidisciplinary approach toward those goals has led from insights about the moth’s sex-pheromonal communication system to recent analysis of odor-dependent interactions with host plants.