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The Neural Basis Underlying the Acquisition of Anticipation

It has been well established that the availability of different resources and stimuli, such as food, mates, and pain, have a profound effect on physiological rhythms, as well as neuronal and behavioral activity in animals. For example, when animals have access to food that is restricted to a specific period of time each day, an increase in their locomotor activity, known as Food Anticipatory Activity (FAA), is observed in anticipation of the feeding time. The specific brain regions and circuitries necessary and sufficient for the development of anticipation are currently unknown. Various brain sites have been observed to have been implicated in anticipatory processes including, the Dorsal Medial Hypothalamus (DMH), the Lateral Hypothalamic Area (LAH), Ventral Tegmental Area (VTA), and the Nucleus Accumbens (NAcc), yet a comprehensive understanding of the underlying brain circuitry for this behavior is not fully understood.

The present study aims to answer two previously unexplored questions related to the neurobiology of anticipation, using FAA as a method. The first question aims to understand the neural basis underlying the development of anticipation, by comparing the levels of c-Fos, a commonly used marker of neuronal activity, in previously implicated areas of the mouse brain from animals at the third and tenth day of a restricted feeding paradigm. The second question addressed whether c-Fos indicates all active neural sites during anticipation, or whether other markers of neuronal activity, such as pERK or FosB, would implicate novel brain regions. This is a work in progress.