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Neural Basis of Age- and Experience-Dependent Changes in Stress Reactivity

Previous experiments have indicated that pubertal development and prior stress experience interact to modulate hormonal stress reactivity. Specifically, prepubertal rats show prolonged stress hormone responses following acute stress compared to adults, and after repeated exposure to same stressor (i.e., homotypic stress), prepubertal animals display a sensitized response, while adults show a habituated response (Figure 1). In adults, the posterior paraventricular thalamic nucleus (pPVT) was discovered to have a role in regulating in the habituation response to homotypic stress, while having no effect on the acute stress response. However, it is currently unknown what role the pPVT may play in the unique responses of prepubertal animals following acute and homotypic stress. We hypothesize that the pPVT functions to regulate the HPA hormonal response to stress in a similar fashion in prepubertal and adult male rats. The present set of experiments will examine the hormonal response of pPVT-lesioned prepubertal (30 days of age) and adult (70 days of age) male rats after exposure to acute (30 min) or homotypic (30 min/d for 7 d) restraint stress. In adults, we found lesions of the pPVT blocked the habituated hormonal response to homotypic stress while pPVT lesions had no effect in the hormonal response to acute stress. We are currently exposing prepubertal males to the same surgical procedures and stress paradigms to determine the specific role of the pPVT on the effects of age on the hormonal stress response.