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Stress-Induced Oxytocin and Vasopressin Responses in Male Rats Before and After Pubertal Development

Puberty is a time of development that is often marked by various stress-related vulnerabilities, such as depression, anxiety, drug use, and obesity. In response to stress, individuals release a number of hormones to help cope with the stressor. One such response is mediated by the hypothalamic-pituitary-adrenal (HPA) axis. Previous studies have shown that peri-adolescent animals display a greater stress-induced HPA response compared to adults. Thus, changes in hormonal stress reactivity may contribute to these vulnerabilities. A separate system, called the hypothalamo-neurohypophyseal tract (HNT), is also activated in response stress. In adults, activation of this system results in secretion of oxytocin (OXT) and vasopressin (AVP) from neurons in the magnocellular subdivision in the paraventricular nucleus (PVN) and supraoptic nucleus (SON) through the posterior pituitary into the bloodstream. The response of the HNT of prepubertal animals is presently unknown. Given the influence of these hormones on a variety of emotional and social behaviors, the following study investigated the stress-induced OXT and AVP hormonal and neural responses in prepubertal (30 days of age) and adult (70 days of age) male rats exposed to acute stressor. Though we found that prepubertal animals show a greater and more protracted HPA response than adults, we found that only adults show a significant stress-induced OXY and AVP response from the HNT. We are currently measuring activation of the OXY and AVP neurons in the PVN and SON of the prepubertal and adult brain to establish the mechanism that may mediate this age-dependent change in the HNT. These data indicate that pubertal-related changes in hormonal stress responses are dependent on the neuroendocrine system examined, and that a greater appreciation of these differences may contribute to our understanding of the stress-related vulnerabilities during adolescence.