OXYTOCIN: FROM ATTACHMENT TO BOND DISRUPTION

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In mammals, social relationships are essential in everyday life and important for the well-being of individuals. Prairie voles (*Microtus ochrogaster*), which form life-long pair bonds, have emerged as an excellent model to study the neural underpinnings of pair bond formation and disruption. Here, the loss of a partner results in emotional and physiological dysregulations . In more detail, within the nucleus accumbens (NAcc) shell, an essential brain region for the formation of a partner preference, oxytocin signaling is decreased following partner loss. This is caused by an increased activity of the corticotropin-releasing factor (CRF) system; loss of the partner acts as chronic stress, thereby upregulating the CRF system, which in turn suppresses the oxytocin system specifically in the NAcc shell. Furthermore, since stress affects the neuroimmune system, we asked if separation from the partner has an effect on microglia, the immune cells of the brain. In males, partner loss shifted microglia towards a more activated morphology within the NAcc shell, indicated by a decrease of ramified cells. In contrast, in females separation lowered the activated microglial morphology within the prelimbic cortex. Taken together, separation of a pair bond has a multifaceted influence on the emotional, neuronal, and glial homeostasis of prairie voles, inducing alterations of systems involved in facilitation of partner preference. These studies have a high translational value given the similarities in neurotransmitters and brain regions in conjunction with the high prevalence for complicated grief in humans after partner loss.