
Ecology, physiology and behaviour

The effects of pair bond interruption on emotion in male mandarin voles and its neuromechanismShi, Jinxiao¹; Zhao, Peiwen¹; Cui, Shunping¹; Li, Changxin¹; Yang, Yang¹; Yang, Yuying¹; Jia, Rui^{1*}¹ Shaanxi Normal University, College of Life Sciences, Xi'an, Shaanxi, China

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Social bonds play a pivotal role throughout the lifespan of (social) animals including humans. Stable and long-lasting social bonds have positive effects on emotion, physiology, and behaviours. However, the neuromechanism of pair bond interruption on emotion is not clearly known. In this study, monogamous male mandarin voles (*Lasiopodomys mandarinus*) were used to study the neuromechanisms of the oxytocin (OT) system after pair bond interruption which likely induced emotion disorders.

The results showed that pair bond interruption can induce anxiety- and depression-like behaviours in mandarin voles. We find that pair bond interruption impaired maturation of dendritic spines in the NAccShell, increased neuron activity in the paraventricular nucleus (PVN), decreased OT-ir fiber density to NAccShell, inhibited neuron activity and OT receptor protein levels in the NAccShell. Exogenous administration of OT and OTR-A influenced behaviours, with OTR-A mimicking interruption effects and OT reversing them. In conclusion, the present study proved that pair bond interruption can induce emotion disorders in male mandarin voles and the OT system in the PVN-NAccShell neural circuit may play a key role to modulate behaviours. These conclusions enhance our understanding of the neuroendocrine mechanisms underlying emotional disturbances caused by pair bond interruption, and provide a theoretical basis for future research and treatment of emotional disturbances induced by pair bond interruption.