



Learning of maternal behaviors facilitated by a frontal cortical circuit to dopamine system

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Maternal behaviors, which are crucial for the survival of mammalian infants, can be learned through experience, particularly in virgin females exposed to pups. How the efficient acquisition of these behaviors is implemented at the neural circuitry level remains poorly understood. Here, we will describe our recent findings on the role of the orbitofrontal cortex (OFC) in efficient maternal behavioral acquisition through the mesolimbic dopamine system. By chronic microendoscopy, we observed robust yet adaptable representations of pup-directed anticipatory and motor-related activities within the OFC that significantly overlapped with those related to nonsocial reward signals. Inactivation of OFC output reduced the phasic activity of midbrain dopamine (DA) neurons specifically tied to pup retrieval and impaired DA release modulation in the ventral striatum during the acquisition of maternal behaviors. These results suggest an important role of top-down signals from the OFC in modulating the DA system, thereby promoting efficient maternal behavioral learning in virgin female mice.

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