

Extended Abstract

Neural mechanisms underlying maternal separation-evoked postpartum depression and hypogalactia in lactating rats

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Efforts to breastfeed the babies for more than 6 months are the recommendation of WHO and the wishes of most of the mothers. However, many factors can cause maternal separation from the babies, leading to the failure of breastfeeding and postpartum mental disorders. To alleviate this condition, many measures have been applied, such as using milk pumps for regular hour workers, reducing heavy duty of service mothers and applying milk-producing drugs, and they do have limited effects; however, that is far from the expectations of mothers and high standards of modern Medicare. Thus, fully understanding the mechanisms underlying postpartum depression and hypogalactia evoked by mother-baby separation is essential for identification of the potential targets of medical mediation and for designation of more efficient therapies. Here we report that intermittent separation of mothers from their babies in lactating rats could result in significant reduction of dams' interests toward their offspring as shown in an elongation of the retrieval latency of pups and decreases in the frequency of anogenital licking. Moreover, the separation also reduced litters' body weight gains over 1 h suckling. These findings indicate the occurrence of postpartum depression and hypogalactia. Next, we explored potential mechanisms responsible for these effects of maternal separation in association with the activity of the hypothalamic oxytocin-secreting system, a major machinery of mental health and lactation. In the supraoptic nucleus, maternal separation significantly reduced the excitability of oxytocin neurons that also failed to show burst firing in response to burst-evoking drugs in patch-clamp recordings. Maternal separation also disrupted signaling cascade downstream to oxytocin receptors as shown in increased oxytocin receptors but reduced molecular association between this receptor with its downstream signals including the alpha subunit of Gq/11-type G protein and phosphorylated extracellular signal regulated protein kinase 1/2 in Western blots. These changes are accompanied with increased expression of glial fibrillary acidic protein around oxytocin neurons, an indicator of expansion of astrocytic processes and increased inhibition of oxytocin neuronal activity. Consistently, serum oxytocin levels during suckling stimulation, particularly that accompanying with milk ejections, reduced significantly. These findings highlight that maternal separation can reduce the excitability of oxytocin neurons and decrease the ability of pulsatile secretion of oxytocin, which lead to postpartum depression and lactation failure.

Biography:

Ping Wang has completed her M.D. in 1983 from Harbin Medical University and postdoctoral studies from Yale University School of Medicine, University of California-Riverside and LSUHSC-Shreveport. She is now a distinguished research fellow in the Department of Medical Genetics in Harbin Medical University. She has published many papers in reputed journals.