

## Noradrenergic neurons in the locus coeruleus are critical for coping with social stress in lactating female mice

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Parental stress is one of the factors to cause child abuse. However, not all of the parents cease to raise their children under severe stress conditions. The failure of stress coping may be involved in child abuse. In this study, we investigated the neuronal mechanism for stress coping using a social stress in lactating female mice. A C57BL/6J dam was housed with a strange ICR male mouse for ten minutes at postpartum day one, followed by exposure to the male overnight with a transparent separation. After repetition with the same procedures for four consecutive days using a strange male every day, the behavioral tests were performed. The repeated social stress mildly inhibited maternal care and decreased immobility in the forced swim test, indicating that dams exposed to the social stress nurture their pups with increasing active coping behavior. We next investigated whether noradrenergic neurons of the locus coeruleus (NA-LC) involved stress coping in dams. Chemogenetical inhibition of NA-LC during social stress severely prevented maternal care and increased immobility in the forced swim test. These findings indicate that NA-LC are required for coping with social stress in lactating female mice. The failure of stress coping via NA-LC may cause neglect in child care with depression.