

Early maternal separation attenuates the effect of social isolation during adolescence on HPA axis responsiveness in adult rats

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In early childhood, one of the most stressful event is the repeated and long-lasting maternal separation (MS) that triggers a series of molecular as well as behavioral and hormonal fluctuations. Another important time-point in the mammalian life is the post-weaning period, in fact, when stressful events such as social isolation (SI) occur, this triggers several changes in brain development and behavior. Our working hypothesis is that variation in post weaning environment can interact with the effects of early postnatal stress in a complex mutually interacting process and, therefore, may affect the future outcomes in the offspring in a way that cannot be predicted by the effect of each stress paradigm alone. Three hours of separation from the dam (3-15 postnatal day) reduce SI-induced effects on allopregnanolone and corticosterone levels and modify the responsiveness to acute foot-shock stress in animals subjected to SI suggesting that MS protocol might help animals in the adult age to be less susceptible to stressful stimuli. This effect is showed also on BDNF expression, in fact the BDNF amount observed in MS animals subjected to SI is similar to that measured in MS group but significant higher than SI animals. Our results suggest that in rats a daily brief separation from the mother during the first week of life, which 'per se' did not substantially alter adult function and reactivity of HPA axis, elicited a significant protection versus the subsequent long-term stressful experience such that induced by social isolation from weaning.