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Perinatal undernutrition: Functional and architectural alterations at the basolateral amygdala associated with the maternal response of the Wistar rat

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Perinatal undernutrition (PU) has severe long-term consequences on the brain neuronal organization, underlying the cognitive processes including the maternal response. The late-emerging effects of PU on pups' retrieval were correlated with the dendritic arbor and perikarya measurements (Golgi-Cox) of multipolar basolateral amygdala (BLA) neurons examined on the lactating dams at day 4 and 12. In the underfed group, pregnant F0 dams received different percentages of a balanced diet. Prenatally underfed (F1) pups followed their undernutrition by remaining daily (12 h) with a pair of dams one with a nipples ligature. Weaning was at 25 days of age and then given an ad lib diet until 90 days of age when F1 dams were maternally tested. Mothers with PU showed prolonged latencies for carrying pups on day 12 by erratic and inappropriate body areas. Reductions in the area and perimeter of perikarya BLA multipolar neurons of early PU dams were identified on day 4, as well as alterations in the number of crossing and dendritic orders, with less consistent reductions in the number of spines. The data indicated that PU resulted in long-term impoverished maternal responses that may correlate with the different hypoplastic neuronal effects on the BLA; however, the effects did not result in increased maternal response as previously described. It is possible that anatomical alterations may be related with a different olfactory afferent influence such as the tactile or auditory pups' stimulation to interfere with the BLA memory consolidation because the disrupted mother-litter bonds occurring early in life.

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