Early postnatal environmental enrichment restores neurochemical and functional plasticities of the cerebral cortex and improves learning performance in hidden-prenatally-malnourished young-adult rats

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Moderate reduction of dietary protein (from 25% to 8% casein) in pregnant rats, calorically compensated by carbohydrates, gives rise to ?hidden prenatal malnutrition? (HPM) in the offspring since it does not alter body and brain weights of pups at birth. However, this dietary treatment leads to decreased ?-adrenoceptor signaling and brain derived neurotrophic factor (BDNF) levels in the pup? brain, altogether with defective cortical long-term potentiation (LTP) and lowered visuospatial memory performance. Since early postnatal environmental enrichment (EE) has been shown to exert plastic effects on the developing brain and neuroprotection both on cognition and on structural properties of the neocortex, in the present study we addressed the question of whether early postnatal EE during the lactation period could exert compensatory changes in the expression of

®-adrenergic receptors and BDNF in the neocortex of HPM rats, and if these effects are associated with an improvement or ev