Effect of prenatal protein malnutrition on long-term potentiation and BDNF protein expression in the rat entorhinal cortex after neocortical and hippocampal tetanization

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Reduction of the protein content from 25 to 8% casein in the diet of pregnant rats results in impaired neocortical long-term potentiation (LTP) of the offspring together with lower visuospatial memory performance. The present study was aimed to investigate whether this type of maternal malnutrition could result in modification of plastic capabilities of the entorhinal cortex (EC) in the adult progeny. Unlike normal eutrophic controls, 55-60-day-old prenatally malnourished rats were unable to develop LTP in the medial EC to tetanizing stimulation delivered to either the ipsilateral occipital cortex or the CA1 hippocampal region. Tetanizing stimulation of CA1 also failed to increase the concentration of brain-derived neurotrophic factor (BDNF) in the EC of malnourished rats. Impaired capacity of the EC of prenatally malnourished rats to develop LTP and to increase BDNF levels during adulthood may be an important factor contributing to deficits in learning performance having adult prenatal