Mild Hyperhomocysteinemia Alters Ectonucleotidase Activities and Adenine Nucleotides Concentration in brain of Adult Rats

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Increased homocysteine levels can be responsible for cerebral diseases. ATP is an excitatory neurotransmitter while adenosine is a neuromodulator in the central nervous system. Considering that elevated levels of homocysteine are a risk factor to cerebral diseases, and that adenine nucleotides are important to brain normal function, this study investigated the effect of chronic mild hyperhomocysteinemia on ectonucleotidase activities in the synaptosomal fraction of rat cerebral cortex and evaluated ATP, ADP, AMP and adenosine levels in cerebrospinal fluid of adult rats by HPLC. Homocysteine (0.03 µmol/g) was administered subcutaneously from the 30th to the 60th day of life. Animals were killed 12 hours after the last injection of Hcy and the cerebral cortex and cerebrospinal fluid were removed. Our results showed that homocysteine decreases the nucleotide hydrolysis in synaptosomal fraction of rat cerebral cortex. The concentrations of ATP were increased, while ADP, AMP, and adenosine were decreased in cerebrospinal fluid of treated rats. These findings suggest that the increase in ATP and decrease in adenosine concentrations could be involved in the modulation of processes related to brain excitability and contribute for neurological dysfunction caused by mild hyperhomocysteinemia.

Word Keys: hyperhomocysteinemia; ectonucleotidases; adenine nucleotides.