



Short communication

Changes in hippocampal amino acid concentrations after chronic administration of corticosterone

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Abstract:

The effects of acute rise in corticosterone concentration upon the levels of hippocampal glutamate (Glu) are well described. Much less is known about the effect of chronic elevation of glucocorticoids on hippocampal glutamate. This is an important question, given the role of glutamate in the neurodegenerative and cognitive effects of chronic stressors. To this end, we have compared the effects of acute and chronic (25 days), administration of corticosterone on the concentration of glutamate, and gamma-aminobutyric acid (GABA), in the dorsal hippocampus, in freely moving rats. The acute administration of corticosterone (20 mg/kg) produced an expected increase in hippocampal concentration of extracellular glutamate and a smaller but significant enhancement of local concentration of GABA. The Glu/GABA ratio remained unchanged, indicating that the balance between excitatory and inhibitory processes was not affected. In the chronically treated animals, the baseline concentration of glutamate and the Glu/GABA ratio were increased. Most interestingly, a challenge dose of corticosterone given to the animals chronically pretreated with this hormone almost completely depleted hippocampal glutamate, and decreased the Glu/GABA ratio. In summary, the present study showed that chronic administration of corticosterone increased the hippocampal concentration of glutamate. Possible implications of this phenomenon are discussed.

Key words:

corticosterone, hippocampus, microdialysis, glutamate, GABA, rat
