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UPREGULATION OF CALBINDIN-D-28k IMMUNOREACTIVITY BY EXCITATORY AMINO ACIDS

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INTRODUCTION

Calcium in the past few years has been shown to have important signaling and regulatory roles in the cytoplasm. It is also believed that, in excess, it can be toxic (see 15). While many studies have been done on calcium and its roles, relatively little is known about how cells might regulate cytoplasmic calcium. Sequestration, metabolic pumping and exchange extrusion (see 8) are the principal ways cells are thought to keep cytoplasmic calcium at low levels. On the other hand, several proteins with high calcium binding capacities have been identified in many cell types (see 22). Calbindin D-28k (Calbindin), a calcium binding protein, vitamine D dependent, 28 kd, (42, 43) belong to the group of intracellular proteins having high affinity for calcium and are supposed to have an intracellular buffering function (see 22). Selected types of neurons of the mammalian central nervous system contain Calbindin and the immunoreactivity to this protein is generally used to identify these neurons in normal and experimental conditions as well as in degenerative diseases (27, see 9). This identification rests on the non verified presumption that "physiological" concentrations of Calbindin, detected by immunohistochemistry, remain unchanged. The cerebellum contains the highest concentration of Calbindin (42) and, in the adult cerebellar cortex fixed *in vivo*, the Purkinje cells (PCs) are exclusively Calbindin immunoreactive (Calbindin-IR) (3). They are therefore a good model to study experimental changes of the Calbindin-IR. The present experiments were designed to investigate whether changes in Calbindin-IR of the PCs could be induced by excitatory amino acids (EAA). In fact many neurodegenerative diseases recognize a pathophysiology initiated by the neurotoxic action of the EAA and it has been postulated that Calbindin may protect neurons from EAA toxicity (23). Part of these results were reported in a preliminary note (5).

METHODS

The experiments were performed in 57 Sprague Dawley rats. Cerebella were rapidly removed from the animals decapitated under ether anesthesia. Three to five cerebellar slices (400 μm