

N-methylaspartate-activated calcium channels in rat brain cortex slices. Effect of calcium channel blockers and of inhibitory and depressant substances

Riveros,

Orrego,

N-Methyl-dl-aspartate, l-glutamate, kainate and dl-homocysteate were found to increase the initial rate and the maximal uptake of ^{45}Ca into the non-inulin space of rat brain cortex slices incubated in vitro. The N-methylaspartate-stimulated calcium uptake was blocked by cadmium and cobalt ions, but not by the organic calcium channel blocker nifedipine or by tetrodotoxin, both of which stimulated the N-methylaspartate-independent calcium influx, γ -Aminobutyrate increased the spontaneous calcium influx, and also reduced that stimulated by N-methylaspartate to the same level, as found with γ -aminobutyrate alone. Adenosine (1-100 μM), ethanol (0.1 M), pentobarbital (10-100 μM) and morphine (0.2 mM), were unable to inhibit the N-methylaspartate-activated calcium influx. Ethanol (0.1 M), had no effect on the glutamate- or kainate-activated calcium influx. These findings suggest that the excitatory amino acids, because of their neuronal depolarizing action in brain cortex, lead to the opening