N-Methyl-D-aspartate receptors and release of newly-synthesized [^{3}H]dopamine in nucleus accumbens slices and its relationship with neocortical afferences

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Abstract

1. The effects of excitatory amino acid agonists on the release of newly-synthesized [^{3}H]dopamine was examined in slices of nucleus accumbens of the rat.

2. L-glutamate and N-methyl-D-aspartate stimulated the release of newly-synthesized [^{3}H]dopamine, which was completely inhibited by physiological concentrations of magnesium and by the selective and non-competitive antagonist MK-801.

3. Other ligands for excitatory amino acids subtype receptors, such as AMPA and kainic acid, had no effect of newly-synthesized [^{3}H]dopamine release.

4. Frontal cortical ablation produced a significant increase on the N-methyl-D-aspartate-stimulated release of [^{3}H]dopamine.

5. These data suggest that dopaminergic function in the rat nucleus accumbens is modulated by N-methyl-D-aspartate receptors, the sensitivity of which is determined, at least in part, by glutamatergic and/or aspartergic afferents from the frontal cortex.