



## Effect of kindled seizures on rat behavior in water Morris maze test and amino acid concentrations in brain structures

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### Abstract:

The effects of kindled seizures elicited by repeated pentetrazole (PTZ) injections, on learning and memory in the Morris water maze test and on concentration of brain amino acids, were examined in rats. It was found that kindled seizures (a model of temporal lobe epilepsy) produced a profound decrease in learning and memory accompanied by a selective and long-lasting decrease in hippocampal and striatal concentration of glutamate, glycine and alanine in the striatum (*ex vivo* measurement). The concentrations of histamine, serine and  $\gamma$ -aminobutyric acid (GABA) were not selectively affected by kindling. A lower concentration of glutamate and N-methyl-D-aspartate (NMDA) receptor co-agonists in the striatum (glycine and alanine) indicates the general malfunction of the brain glutamatergic system. It is suggested that a selective decrease in hippocampal glutamate concentration may account for deterioration in learning and memory processes in kindled rats, considering the important role of this neurotransmitter in the cognitive processes (e.g. in the long-term potentiation), and the key contribution of the hippocampus to the spatial memory. The intrinsic mechanisms of the reported behavioral effects may involve neuronal damage in the brain limbic structures, secondary to seizure-induced ischemia and hypoxia.

### Key words:

pentetrazole (PTZ), kindled seizures, Morris water maze, glutamate, hippocampus

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