

STRUCTURAL AND METABOLIC CHANGES IN RAT BRAIN HISTAMINERGIC NEURONS UNDER R- α - METHYL HISTAMINE ACTION

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Brain histamine-releasing neurons are located exclusively in posterior hypothalamus, but their processes project to all brain regions and regulate activity of many other types of neurons. They act through the three types of histamine receptors. H₃ receptors are exclusively presynaptically located and are negatively coupled to adenylate cyclase. They are autoreceptors and provide the outoinhibition of histaminergic neurons.

The aim of the study was to find the structural and metabolic changes in brain histaminergic neurons following the inhibition of their function by stimulation of H₃ receptors. It is known that R- α -methyl histamine is a highly specific and effective agonist for H₃-receptors and when it is injected in the lateral ventricle of the brain it inhibits the functional activity of histaminergic neurons in the brain, because of inhibition of synthesis, releasing, and metabolism of histamine in those neurons.

The investigation was carried out in 15 male wistar rats weightings 180-220 g. Under calipsol anesthesia an agonist for H₃-receptors R- α -methyl histamine was injected in the third ventricle of the brain in a dose 0.5 mg/kg in 10 mcl of 0,9 % NaCl. 3 hours later animals were sacrificed and samples of hypothalamus were frozen and store in liquid nitrogen. Criostate sections were treated by Nissl method and histochemically for determination of monoamine oxidase type B (MAO B), dehydrogenases of succinate, lactate, glucose-6-phosphate, NADH and NADPH and acid phosphatase. The size and shape of histaminergic neurons perikarions and activity of the enzymes in their cytoplasm were measured using the computer image analyses system (bioscan, N.T). The primary parameters were treated statistically,

using the computer program "Statistica", 6.0.

It was found that R- α -methyl histamine induces the slight increasing and elongation of hypothalamus histaminergic neurons. In addition the activity of all studied enzymes (for the exception of acid phosphatase) in their cytoplasm significantly decreased. It indicates the great disturbances and inhibition of histaminergic neurons metabolism, which is in a good accordance with data on inhibition of their functional activity following stimulation of histamine H1 receptors by R- α -methyl histamine.

The conclusion: H3-histamine receptor agonist R- α -methyl histamine induces the significant inhibition of the general and specific metabolism of brain histaminergic neurons as well as changes of their perikaryon shape.